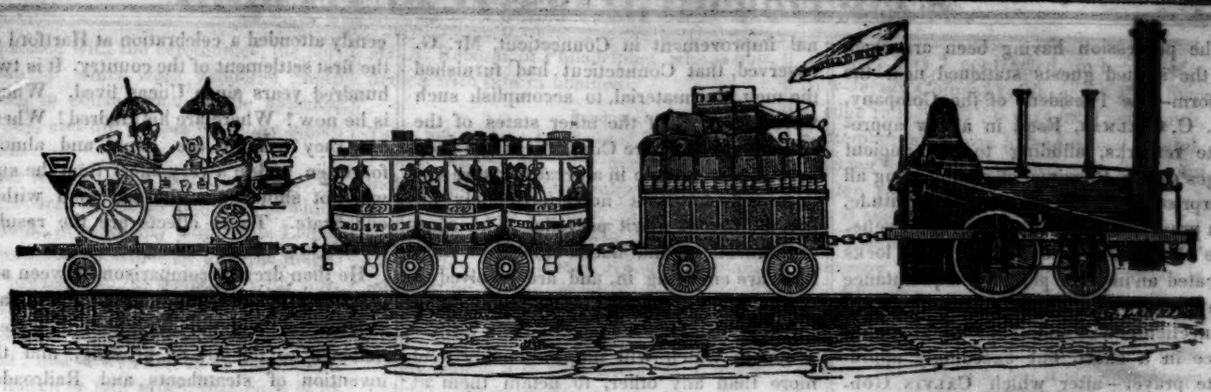

AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

PUBLISHED WEEKLY, AT No. 35 WALL STREET, NEW-YORK, AT THREE DOLLARS PER ANNUM, PAYABLE IN ADVANCE.

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AMERICAN RAILROAD JOURNAL.

NEW-YORK, NOVEMBER 21, 1835.

NORWICH AND WORCESTER RAILROAD.—It is now over three years since the Legislature of Connecticut chartered a Company to construct a Railroad from Norwich to the Massachusetts line, in the direction of Worcester, with a view of opening another easy and direct communication between New-York and Boston. In March, 1833, the Legislature of Massachusetts chartered a Company to construct a Road from Worcester, to meet the Norwich Road, by which the line, between the metropolis of New-England and the growing city of Norwich, is complete.

Since these charters were granted, examinations and surveys have been made which show a highly favorable route; and the immense amount of business along its line, which must pass over it, together with that portion of the travel from New-York, and the interior of New-England, which will naturally take this direction, will, it is believed, afford an amount of transportation which will render it, not only a very useful work, but also a productive investment to its stockholders. That such will be the result, and that it will greatly enhance the value of property along its line, we do not entertain a doubt; Norwich, especially, will feel its influences, and participate largely in the benefits resulting from its operations.

The commencement of such a work, destined, as we believe this is, to change the appearance of the whole country along its line, is worthy of especial notice; and we therefore availed ourself of an invitation, politely tendered by the President of the Company, to witness the interesting ceremony of breaking ground. In order to do this, we left New-York on Tuesday evening, 17th, at 4 o'clock, in that excellent steamboat, *Bunker Hill*, Capt. Sandford, for Norwich, where we arrived at half-past 8 o'clock on Wednesday morning, having remained at New-London from a quarter before 2 until half-past 6 A. M., in time to witness the whole of the proceedings. On her passage, the Bunker Hill stopped at New-Haven, and received on board His Excellency Governor Edwards, and suite; Mr. Ellis, Collector of the Port; Mr. Brewster, President of the New-Haven Railroad Company, and several other distinguished citizens, all of whom participated in the gratifying ceremonies.

We will now endeavor to give our readers some account of the proceedings, although we cannot expect to impart to them any portion of the thrilling interest which they afforded us; it being, singular as it may appear, the first opportunity, of which we have been able to avail ourself, to be present at the commencement of a Railroad.

On the arrival of the Bunker Hill at Norwich, the Governor and suite, and other invited guests, were received at the boat by Messrs. Adams, and L'Homedieu, two of the Marshals of the day, and escorted to the Franklin Hotel. After remaining here a short time, affording an opportunity to some of the citizens of being introduced to the Governor, they were conducted to the Merchants' Hotel, and there joined the procession, which moved at 11 o'clock towards Greeneville, (where the ceremonies were to be performed,) under the direction of ASA CHILD, Esq., Grand Marshal of the day. The uniform companies, accompanied with music, took the lead; next the Governor and suite; the Reverend Clergy; revolutionary soldiers; the Corporation of Norwich and New-London; invited guests; and citizens generally; followed by a procession of several hundred boys, belonging to the schools, with banners; forming one of the most interesting spectacles of the whole exhibition. The procession was closed by an immense CAR, drawn by six horses, on which was displayed samples of the numerous manufactures on the line of the Road. Among the articles, we noticed the following: ingrain carpeting and rugs, domestic goods, blank books, earthen, tin, wooden, and hardware, carriages, boats, cordage, ship blocks, saddles, trunks, cutlery, weaver's reeds, brooms, stoves, harness leather, scythes, axes, glass beads, &c. &c.

The procession passed through the principal streets of Norwich, the windows and doors of the houses on each side being occupied by the ladies, neatly and appropriately dressed; and adding quite an agreeable feature to the scene. On leaving the town, the line of march extended along the banks of the Quinnebaug, from the heights of which minute guns were fired until the procession reached Greeneville. The ground selected for operations is near the centre village, and directly in front, of the splendid manufactories of Greeneville. As the procession approached the ground selected, it passed under a beautifully decorated arch, on which was again displayed numerous and beautiful specimens of the products of Yankee industry.

The ground selected was staked out, and on the south side an immense staging was erected, with ranges of seats rising one above another, covered with ample awnings, beneath which, upon the staging, were near a thousand ladies seated, who appeared highly pleased with the display. The military were formed into three sides of an immense hollow square, the ladies on the staging forming the fourth—the procession marched in and entirely occupied the square, except a space reserved for the ceremonies of the day.

The procession having been arranged, and the invited guests stationed near the platform—the President of the Company, Wm. C. Gillman, Esq., in a few appropriate remarks, alluding to the ancient usages of the Pilgrims of commencing all enterprises, either of danger or magnitude, with prayer, introduced the Rev. and venerable Dr. Nott—whose snow white locks indicated an intimate personal acquaintance with nearly one half the entire history of Connecticut—who addressed the Throne of Grace in a short, but exceedingly appropriate prayer—after which Calvin Goddard, Esq., of Norwich, was called upon, and made a few remarks. He was not unaffected, he said, by the disapointment in not hearing an address from a gentleman who was expected to be present, but who was unavoidably prevented from attending. [The speaker alluded to the Hon. Daniel Webster.] He then remarked that they had assembled on no common occasion; every thing had hitherto been auspicious, and judging from the past, he had no fears for the result of the enterprize in which they were that day engaged. He adverted to an allusion of the Reverend gentleman to their present situation and that of their Pilgrim fathers. It is an interesting historical fact, said he, that two hundred years ago, last Monday, the Pilgrims passed through this county from Massachusetts Bay, having travelled through dense forests, and been fourteen days in performing the journey. It was indeed remarkable, that they should now be engaged in a work, which, whenever completed, would enable us to accomplish the same distance in one half as many hours. There was something peculiar and interesting in these facts. Mr. Goddard next alluded to the scenes of warfare with the then owners of the soil, the savages—to the death of Miantinomo—who, he said, was killed by Uncus, and buried but a short distance from where they then were—to the brave Uncus, the friend of the white man—asking, very appropriately, where are those brave warriors? Where are their people? *Dispersed, degraded,* and *destroyed,*—they have disappeared before the progress of civilization. He also alluded to the fact that it was in this town where the brave Mason fell, and that they were surrounded by interesting incidents of former times. What is our present condition? Compare it with all its advantages and impulses, and what will it or rather what will it not be two centuries hence?

He then referred to a single fact in the government of Connecticut, which was worthy of record—the formation of the government by the people themselves, in their primary assemblies. This was a peculiarity which belonged to no other State.—"We have," said he, "always been under a government of the people."

In alluding to the want of energy and progress heretofore, in the works of internal improvement in Connecticut, Mr. G. observed, that Connecticut had furnished the men, the material, to accomplish such works in most of the other states of the Union, and therefore Connecticut had been permitted to remain in a great measure unimproved—but that now, fortunately for her, a different spirit prevails. The sons of Connecticut, and indeed of all New-England, are engaging in, and are resolved to devote themselves to, the improvement of their own States; the land of their birth—a course which will unquestionably tend more than any other, to detain them at home; and of course to make their native land literally the Garden of America; interspersed with avenues to market, by which their products may be transported rapidly, cheaply and safely—affording rich and ample rewards for their capital, which, as he observed, consists mainly in their unsurpassed industry and enterprise.

Mr. G. said he could not but advert to the rapid growth of Ohio, whose admission into the Union he well recollected, with a population of less than sixty thousand; but on a visit there within a few years, he found her with more than a million of hardy, industrious inhabitants, who were pushing, with great spirit, their works of internal improvement. Why then should Connecticut, whose history is of two centuries, delay to pursue the same path?

She would not, he was confident, longer delay—and with this spirit of liberal forecast and mutual concession and assistance, she will go forward until every part of the State participates in the benefits of Internal Improvements.

After a short and pertinent address from Col. Judson, Member of Congress elect, the President of the Company introduced his Excellency the Governor, and thus addressed him:

I beg leave, Sir, to return you thanks, in behalf of myself and the Directors of this Company, for your presence on this occasion; and permit me to present you with this implement (a pick-axe) with which you are desired to strike the first blow, as a commencement of the work in which we are now engaged, and that we may have an evidence that you are favorably disposed towards it, and also as a token that you will hereafter lend it all the aid in your power.

Gov. Edwards then addressed the company. He said it was the second occasion upon which he had been called upon to perform a similar duty. It was with no small degree of pleasure that he undertook the first, and he felt equal pleasure on the present. On the former occasion he had remarked that it was the first Railroad ever commenced in the State of Connecticut, but he indulged the pleasing expectation of soon seeing them intersect every part of the State; from present indications, those expectations will speedily be realized. In taking a retrospect of past times the mind is filled with astonishment. He had recently attended a celebration at Hartford of the first settlement of the country. It is two hundred years since Uncas lived. Where is he now? Where are his kindred? Where are they? They are gone, and almost forgotten, and in a very short time the sun will not shine upon the red man within our State. These effects are the results of the laws of nature.

He then drew a comparison between ancient and modern times, and gave the advantage to the latter, for which they were indebted to the art of printing, and the invention of steamboats and Railroads; which had changed the face of the world, not only morally and politically, but physically. It was almost impossible to define the influence of Railroads, Canals, and steamboats; but the period was not far distant when we should have, if not our Londons, at least our Liverpools, and Bristols, our Manchesters and Birminghams. These were pleasing anticipations, which would soon be realized, astonishing as they were to ourselves and to the whole world.

The Governor concluded by saying that he did not attend there for the purpose of making a long and elaborate harangue; but to break ground. He would now proceed to perform that duty with the utmost cheerfulness, as his whole heart and soul were in the undertaking.

The President of the Company now stepped forward, and expressed his regret that many of the distinguished individuals who had been invited to attend, had been prevented by other avocations from being present. Among these were Governor Marcy and Chancellor Kent, of New York; Mr. Hale, member of Congress from New London; the late Gov. Lincoln, Hon. Daniel Webster, and His Excellency Edw. Everett, Governor-elect of Massachusetts. He read extracts from the letters of these gentlemen, all of whom regretted being unable to attend, and expressed their best wishes for the success of the work.

The Governor then (half past one) stepped forward with the pick-axe, and commenced breaking ground, which was shovelled into wheelbarrows, by the President and Directors, and wheeled away by the Mayors of Norwich and New London, and John Breed, Esq. The Presidents of other Railroads, the corporate authorities of Norwich and New London, and the other invited guests, were then requested to step

ing been done, the tools and barrows were collected by the Directors, and formally handed over to the Engineers, Messrs. Kirkwood and Laurie, by the President, who, in a few words, reminded them of the importance and responsibility of their duties, and that the Company would look to forward and lend their aid, which hav- them for the faithful performance of their duties, and the proper construction of the Road.

The procession was then formed again in the same order, and returned to Norwich,

much pleased with the ceremonies, the performance of which were rendered more gratifying in consequence of the splendor of the day, and the perfect harmony which prevailed.

On our return to the Franklin House, we found prepared an excellent dinner, of which we partook, in company with a few Ladies and Gentlemen of Norwich and the neighboring towns, who, in common with ourself, appeared to take as much pleasure in the *products*, as in the prospects, of New England; and it was not at all surprising, after a march of four miles, that most of us handled the implements of the table with quite as much earnestness as we had done those in the field.

On leaving the table at half past 3, P. M. —an hour earlier, perhaps, than we should willingly have assented to, but for the necessity of leaving for New York in the boat at 4 o'clock—we parted reluctantly with those from whom we had received, in so short a period, many tokens of respect and kindness.

We left them with feelings of deep interest, not only in the success of the work, in the commencement of which we had participated; but also in the prosperity and happiness of those by whom we had been so cordially received, and so politely treated; and we cannot therefore take leave of the subject without thus publicly expressing our thanks, and at the same time our confident belief that the friends of the *Norwich and Worcester* Railroad will realize their most sanguine anticipations of its utility and value.

The following are the officers of the Norwich and Worcester Railroad:—

Wm. C. Gilman, President.

Directors.

Wm. P. Green,	John Breed,
Wm. C. Gilman,	Asa Childs,
John A. Rockwell,	Thomas Robinson,
Arthur F. Gilman,	E. J. Anderson,
Cha's W. Rockwell,	Abijah Fisher,
Daniel W. Coit,	G. P. Perkins.
Joseph Ripley,	

Engineers.

James P. Kirkwood, James Laurie.

Important to Railroad Companies.—The following letter is from a gentleman in London, on whose opinion we place much reliance, and especially so in relation to the subject on which he now writes to us.

It cannot, in the nature of things, be otherwise than that *Railroad Iron* must advance in price, as the number of Roads under construction increases; and it therefore follows, that those Companies that intend to use iron next season, will do well to give their orders early; and it would seem to us that, where *other* business does not require the sending of an agent to Europe, a better agent could not be employed than Mr. Ralston, who writes this letter, or his brother, Mr. A. Ralston, of Philadelphia, who is connected with him in business.

London, October 9, 1835.

To the Editor of the Am. Railroad Journal:

Dear Sir,—I beg your acceptance of the inclosed papers, on the subject of Railways projected in this country. The evidence of several eminent Engineers, given before a Committee of the House of Lords, contains information of the greatest value on the subject of the gradients on a Railway, and I think your readers will be grateful to you for publishing it in your excellent Railroad Journal. As your readers are much interested in Railway Iron, I will communicate the most recent information on the subject of common iron, the demand for which, of course, regulates the price of the other. On the 25th August last, the iron masters of Wales had a meeting at Cardiff, and ascertained, from mutual inquiries, that there had been a diminution of the stock of iron, (Welch only,) since the commencement of this year up to that time, of the large quantity of 45,000 tons, notwithstanding the manufacture was going on more extensively than usual. This fact induced them to advance the price of No. 2, bars, from £5: 10 per ton to £6 per ton. Since then orders have come in on the most extensive scale, and, on the 9th Septemher, ult., they were induced to advance the price to £6 : 10 per ton; and again, on the 30th September, ult., they announced a further rise of 10 shillings per ton, making £7 per ton free on board at Cardiff and Newport. The Staffordshire, Shropshire, and other midland county iron masters, have advanced in an equal proportion. Some of the largest iron masters have recently informed me, that so great is the demand, that all the establishments in Wales have already orders for execution to keep them busy during the remainder of this year; and as orders continue to come in from all quarters, principally from the Mediterranean, Holland, Germany, the United States, and also for exportation to the East Indies and China, whilst the home demand, for Railway and other purposes, is for an extraordinary amount, there is every prospect of another advance of 10 shillings per ton, before the expiration of many weeks. I am told by experienced persons, that the demand now is greater for iron than was ever before known, excepting during the bubble year, 1825, when the demand was altogether of a speculative character; now the demand appears to be, exclusively and *bona fide*, for immediate consumption.

To show you how this affects Railway Iron, I will communicate a few particulars of my own transactions, within a few months. I contracted, on the last of March last, on behalf of a Railway Company, in the State of New-York, for about 1000 tons of iron, and paid £7 : 4 per ton for edge rail, (being No. 3 iron, and when manufactured into rails, ought to be 40 shillings per ton higher than common No. 2 bars.) Early in May I contracted, in behalf of a New-Jersey Company, for about 1600 tons of edge rails, at £7 : 6 per ton. Last month, September, after iron had advanced 20 shillings per ton, I made a contract for 2000 tons of edge rails, for a Delaware Company, at £8 : 5 per ton; and a few days after, for 1300 tons of edge rails, for a Pennsylvania Company, at £8 per ton, but the pattern is less difficult to roll than that for the Delaware Company. I have also contracted for several thousand tons of chairs, pins, wedges, flat bars, &c., but it is unnecessary to give their prices, because they are regulated also by the price of No 2 common bars.

To enable your readers to judge what would be the price of to-day, if I were now in the market, I should think the March, May, and September contracts could not be done under £8 : 15 per ton; and that for the Delaware Company, (being difficult to manufacture,) not under £9 per ton. From this you will see, that those Companies who sent their orders early, have reason to congratulate themselves, that they have been executed before the great advance in iron was effected. As the great Railway from "London to Liverpool" (220 miles) may want some 20,000 or 25,000 tons of very heavy rails, (60lbs. per yard,) in the spring, and as the "Southampton," (75 miles,) "Western," (120 miles,) and many other minor Railways will want large quantities, during the summer of next year, I should not be surprised if edge rails should be advanced to £11 per ton, by the 1st of May next, and iron will continue high during the whole of next year. I may be mistaken, but having had some experience in this trade, from having bought and exported to the United States (my brother and myself) upwards of 40,000 tons of Railway Iron, within a few years, I think I have some acquaintance with the iron market of this country. If the French Government should imitate the wise example of our American Government, and allow Railway Iron to be imported free of duty, as it is now reported to be their intention, I have no doubt this will give an impetus to the construction of Railroads in that country, which will still further advance the price of iron. All countries throughout the world must get their Railway Iron in England, where it is manufactured with such economy, such rapidity,* and so perfectly, that it is useless to pretend to compete with this branch of industry.

I beg to send you the London Mechanics' Magazine for August, and to ask the favor

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*I once had 1800 tons of edge rails, of 40lbs. per yard, manufactured and shipped within 4 months from the time the order left America. It was for the State of Pennsylvania; the order left Philadelphia on the 6th May, and *all* the iron was on ship board, on its way to Philadelphia, before the 1st of September following. This extraordinary despatch was accomplished by *one* house in Wales, who had their regular business orders to attend to, besides the execution of this contract. The *whole of France* could not execute this order in 4 months! But I would not promise equal despatch now, for all the iron masters are so busy, and have such an abundance of orders, that much more time than usual must now be allowed to them.

of your obtaining some information respecting the steamboat "Lexington," plying between New-York and Providence. You will observe, in page 384, an account of the performance of this boat from Providence to New-York, 210 miles, in 12 hours, which I cut out of a New-York paper, and sent to the Editor for publication; and in pages 430 and 431, the whole account is treated as a gross exaggeration by "Fanqui," and discredit is thrown upon it by W. Thorold, of Norwich. You will observe the Editor of the Mechanics' Magazine invites the attention of Americans to the letters of Mr. Thorold and Fanqui, for the purpose of controverting their doubts, and to furnish additional information respecting "the fastest boat in the world." I have no means of obtaining this information, or I would not trouble you. But if you will publish Fanqui's letter, and request the proprietors of the "Lexington" to furnish you with authentic information respecting her, which publish, and request the Editor of the London Mechanics' Magazine to transfer to his columns, the character of our countrymen may be vindicated. People in this country think we are rather disposed "to shoot with the long bow," and it is desirable to correct this opinion, so injurious to our national character.

I am, dear Sir,
Very respectfully, yours,
GERARD RALSTON.

In relation te the steamboat Lexington, and the correspondents of the London Mechanics' Magazine, our reader are in possession of the whole subject; and we hope soon to give them, and the readers and *doubters* of the London work, such evidence of the performances of that extraordinary boat, as will put at rest the controversy about the "fastest ship in the world."

LONG LEVELS, WITH STEEP GRADES, in preference to a more uniform distribution through the whole line of the elevation to be overcome, appears to be the opinion of several of the most eminent Engineers in Great Britain.

We publish to-day several extracts from an examination, before the House of Lords, of Mr. *Vignoles*, Mr. *George*, and Mr. *Robert Stephenson*, Mr. *Henry R. Palmer*, Mr. *H. H. Price*, and Dr. *Lardner*, in relation to the most judicious Grades for a Railroad. There appears to be but one opinion amongst them on the subject, which cannot be better expressed than in the language of Mr. Vignoles, in reply to the question, "Do you prefer the course of concentrating the inclination?" which is as follows, viz. "it is far better to keep the line as flat as possible, for a great length of time, and concentrate your power by having a stationary Engine, or an assistant Engine, to overcome it"—(the inclination.)

We annex some remarks upon the *London and Brighton* Railway, together with a table of Gradients of Mr. *Gibbs* and Mr. *Stephenson*, which differ materially in the distribution of the Grades.

We are indebted to Mr. G. Ralston, of Philadelphia, now in London, for these and other favors, for which he will please accept our thanks.

Remarks on the two proposed lines of Railway to Brighton.

Two lines of Railway to connect Brighton with London have been proposed separately by Mr. Gibbs and Mr. Stephenson.

Mr. Gibbs' line terminates at one point in London by the Croydon Railway, and at another by means of the Southampton Railway; Mr. Stephenson has subsequently, in his proposal for a Brighton Railway, fixed upon nearly the whole of Mr. Gibbs' line, but has adopted a different principle in planning his gradients.

The grand point of difference in the two lines is, that the gradients of the one, namely, Mr. Stephenson's, have the several rises and falls distributed over their whole length, whereas Mr. Gibbs has concentrated the rises and falls on *his* line in a few points, in order to obtain throughout the rest of the line either levels, or planes of such slight inclination, that practically speaking, they may be considered level.

The following table of the gradients on the two lines, will show that Mr. Gibbs has almost entirely confined his ascents and descents to three short planes, while Mr. Stephenson has distributed nearly the whole of his over 33 miles, with an inclination of 1 in 330.

Table of Gradients.

MR. GIBBS' LINE.

Miles.	Chains.		Feet per Mile.
11	56	Level.	
3	10	1 in 1002	5 3
6	18	1 in 1188	4 4
5	0	1 in 1028	5 2
3	36	1 in 114	46 3
2	31	1 in 107	49 4
5	5	1 in 2138	2 6
2	31	1 in 111	47 8
8	0	1 in 1289	4 9

MR. STEPHENSON'S LINE.

Miles.		Feet per Mile.
15	1 in 1100	4 9
5½	550	11 7
33	330	16 0

It is well known to all those who have attended to the progress of Railways in this country, that the question as to what description of gradient is best adapted for the transit on Railways, has excited the most anxious interest in the scientific world and amongst Engineers.

Accordingly we find that the Committee of the House of Lords on the Great Western Railway Bill, has received important evidence from various Engineers upon this amongst other topics which engaged their attention.

From the evidence adduced before this Committee, the following extracts are taken.

It is unnecessary to comment upon these extracts, which contain the recorded opinions of some of the most eminent Engineers in this country, and their opinions are of so recent a date, that they must be supposed to express the result of their matured judgment and experience up to the present time.

Mr. George Stephenson in evidence on the Great Western Railway Bill, July 1st, 1835.

Question. With the exception of the Box Tunnel, you know of no Railroad of such an extent with such advantageous levels?

Answer. I do not.

Question. With reference to the inclination of the Box Tunnel, in your judgment, is it advisable to select a point where, by making a steeper inclination upon a short line, you can regulate the rest of the levels upon the line advantageously?

Answer. It is always the plan I have adopted in all the works I have been concerned in.

Question. Was that the reason you adopted the short plane on the Liverpool of a mile and a half, where you have one in ninety-six on the one side, and one in ninety-eight on the other?

Answer. It is about ninety on the other.

Question. Did you select those inclinations in preference to spreading it over a larger surface of your Railway?

Answer. I did.

State your reasons for doing it.

Answer. To allow the engines to bring the heaviest loads possible to the bottom of the inclined plane, by having an assistant engine to get up the load; but if I had distributed that inclination over a longer length, the engine could not have got up that long incline, and it is too long to have an assistant engine.

Mr. George Stephenson. July 2nd, 1835.

Question. Is not the expense of the repair of the engines very much in proportion to the gradients upon the line?

Answer. It is.

Question. And the difficulties they have to overcome?

Answer. Yes.

Question. And therefore you think it better to have a steeper rise at one place, to be worked by a supplementary engine, or a fixed engine, than to give worse gradients throughout the line?

Answer. That is my opinion.

Mr. Vignoles in evidence on the Great Western Railway Bill. July 13th, 1835.

Question. Is 1 in 107 a very bad plane?

Answer. No; it appears scarcely a rise to the eye of a common observer; it is a plane that requires great additional power, and it is better to concentrate the power in one spot than expend it upon long inclinations over a greater space of ground.

Question. Do you prefer that course of concentrating the inclination?

Answer. Most undoubtedly; it is far better to keep the line as flat as possible for a great length of time, and concentrate your power by having a stationary engine, or an assistant engine to overcome it.

Copy of a Report by Messrs. Stephenson and Palmer.

"To the Directors of the Great Western Railway Company:

"Gentlemen,—In reply to your inquiry relative to our investigation of the proposed line of Railway between London and Bristol, in which you particularly refer to the practical construction of the work, and the working of it by locomotive engines when completed, and whether Mr. Brunel had taken our opinion before he made the selection between the two inclinations at Box; we beg to state that we have examined the whole of the important parts of the proposed line, and consider it judiciously selected, not only as regards the execution, but also the working of the line when executed: and that Mr. Brunel did take our opinions upon the two planes at Box.

"Our advice to him was that he should

select the shorter and steeper, as by concentrating the rise in one point, with a practicable length for working either by stationary or assistant locomotive engines, he reduced all the remaining inclinations upon the line to the present favorable amount. And we beg in addition to this to state, that many lines with planes of similar or greater length have been executed, and are now working efficiently, and that no difficulties in the execution of the work can be anticipated.

"The levels of your proposed line are undoubtedly superior to those of the Southampton, or the Basing and Bath, or of any other extensive line with which we are acquainted, and are therefore better adapted to the working of the locomotive engines, both as regards economy and expedition.

"We are, gentlemen,
"Your obedient servants,
"GEORGE STEPHENSON,
"HENRY R. PALMER.
"London, March 31st, 1835."

Mr. R. Stephenson in evidence on the Great Western Railway Bill. July 8th, 1835.

Question. Is there more than one way of working a Stationary Engine?

Answer. Yes.

Question. Are those different methods attended with difficulty?

Answer. No; I have seen them all act very efficiently.

Question. I do not know whether you remember the alternative suggested, instead of that Box Tunnel, with a rise of 1 in 107 for two miles and a half?

Answer. Yes.

Question. It was 1 in 333 for nine miles?

Answer. About that.

Question. Which do you prefer?

Answer. I prefer the concentration of the inclination.

Question. What do you gain by the concentration of the inclination?

Answer. You apply a fixed Engine to that to which it is more applicable, and it is more economical upon that inclination; and you make the remainder of the distance extremely favorable for the operation of Locomotive Engines.

Question. What do you gain by it in point of power?

Answer. Very great economy of power, and you save a great deal of wear and tear in the Railway.

Question. Where the proportion of that inclination is two miles and a half, and the rest of the line such as you have described it, do you gain in point of speed also?

Answer. Yes; but the principal saving is economy.

Mr. R. Stephenson in evidence on the Great Western Railway Bill. July 10th, 1835.

Question. Have you any knowledge of the Tunnel at Box Hill, except what you have derived from Mr. Brunel?

Answer. As to the cost of making the Tunnel I cannot give an opinion.

Question. Do you know any thing of the country at that spot, so as to judge of the expediency of making a tunnel or not?

Answer. No; I treat it as an abstract question.

Question. Tell me the *data* upon which you proceed?

Answer. In preference to an inclination of six or eight miles at sixteen feet in a mile, I prefer a Tunnel; but I would not make a Tunnel in other cases to avoid an inclination; it is made here to enable the common engine to accomplish the journey upon the rest of the line.

Mr. H. H. Price in evidence on the Great Western Railway Bill. July 7th, 1835.

Question. With reference to the Box Tunnel, do you approve of the method we have heard so much of, namely, the concentration of the steepest inclination upon one spot?

Answer. Yes; I stated that opinion to Mr. Brunel when I first met him at Stroud, after the plans were deposited.

Question. That is not an opinion you have taken up lately?

Answer. No.

Question. What is the advantage gained by that concentration?

Answer. That you may apply assistant power to overcome the elevation of the country at one point, instead of spreading it over a greater space of the line.

Question. What is the result if you do not apply assistant power?

Answer. They carry lighter loads, or they go at a smaller speed.

Question. Or—is there not another alternative?

Answer. You may have a fixed engine.

Dr. Lardner in evidence on the Great Western Railway Bill. August 6th, 1835.

The artifice used in forming the Great Western Line (and a very good one it is) consists in concentrating the greatest rise in both directions upon one spot, and by that means obtaining a more uniform level, and so far as that goes it is a great advantage.

Mr. R. Stephenson in evidence on the Southampton Railway Bill. June 25th, 1834.

Question. Is it an object also to get the best levels that can be got?

Answer. Of course it is.

Question. If the level in such a Railroad as this, is such, that there are fifteen miles in going up to the summit of 1 in 300, would you consider that as an inconvenient rise, if you could avoid it?

Answer. If I could avoid it, certainly.

Question. Would you prefer lessening the inclination, and having a short part where the inclination should be so much greater as to require the assistance of an Engine.

Answer. I think I would prefer a short piece.

Question. Upon the Liverpool and Manchester you have two inclinations of one in eighty-six and one in ninety-six?

Answer. Yes.

Question. Was that mode of construction adopted with a view of enabling the engines to act with all their full power up to the rest of the line, and to have the assistance of stationary engines at that point?

Answer. That was the object.

Question. I believe you consider that an inclination of 1 in 240 diminishes half the power?

Answer. Yes, thereabouts: it has been taken at 300, but I think 1 in 240 is more correct.

Question. Should you consider it desirable to construct a line of Railroad with fifteen miles with an inclination of 1 in 300, or should you prefer a shorter length of a steeper inclination?

Answer. I should prefer the short inclination, if the other levels that were obtained by that means were good levels.

Question. If by making a steep inclination for a short distance of two or three miles, you could lessen the inclinations upon the general line, so as to enable the locomotives to carry a weight nearly to the extent of their power, you would consider that a preferable mode?

Answer. Yes, I would; it is impossible to give a general answer to that question; I should be guided by the circumstances of the case.

Question. Supposing you could form a line in which you might go with an inclination, where instead of diminishing the power of the engines one half, it was not diminished one quarter, but when they arrive at a particular point, they might require the assistance of another engine, because it diminished the power two-thirds, would you prefer the [line] upon which the diminution of the power of two-thirds was only for a short distance, and where the rest of the line gave three-fourths of the power?

Answer. I think I would.

Question. (By a Lord)—Might not there be other circumstances which would render the other line the best?

Answer. I merely speak as an Engineer generally upon the subject. I cannot at all speak as to any local difficulties that may arise; speaking as an Engineer, I would prefer a long line, upon which an engine could operate to its full power with a short inclination when an assistant engine was wanted.

A CANAL ROUND THE FALLS OF NIAGARA is certainly a desirable link in our chain of internal communication on the great lakes.

The highest considerations of expediency connected, not less with the military defence of the Northern frontier, than with the commercial and agricultural interests of this State, and of the whole Mississippi Valley, point to the construction of such a Canal—if found reasonably practicable.

From a Circular published to-day, drawn up by a committee in Oswego, it would seem that a survey of the route has been made, during the past season, under the authority of the general government, which establishes the complete practicability of the work; and, accordingly, memorials are to be addressed to Congress, at the approaching session, asking their aid towards its accomplishment. We hope these memorials will be multiplied, so as to constitute an irresistible call upon the National Legislature to do what is needful in the matter.

The Oswego Circular argues the matter mainly as a local interest. It has, however, higher claims than that; nor need Buffalo even apprehend, if the Canal should be constructed, and a Ship Canal to boot between the Hudson and Oswego, but that it still would flourish abundantly, and grow with the growth of all around it.—[N. Y. American.]

Canal round the Falls of Niagara.

CIRCULAR.

Oswego, Nov. 6th, 1835.

SIR,—The undersigned, a committee appointed by the citizens of the county of Oswego, in the State of New York, in relation to the Niagara canal, and especially for the purpose of presenting a Memorial to Congress, and for disseminating information respecting the merits of the project to their fellow citizens in other parts of the Union, would respectfully offer to your consideration the following statements.

Memorials exhibiting the great advantages anticipated from the construction of a Ship Channel, by which the obstruction now interposed by the Falls of Niagara to an uninterrupted navigation from the upper Lakes to Lake Ontario would be removed, have been presented to Congress from several parts of the State of New York, the north western States, and the Michigan Territory. These Memorials met with a very favorable reception,

and would probably have led to some favorable action on the subject, but for the limited term of the last session, and the absorbing questions which occupied its close. The Department of War, however, deeply impressed with the importance of the projected Canal, not only in respect to the commercial relations subsisting between the East and the West, but to the military defence of the Northern frontier, in the month of May last detailed a corps of Topographical Engineers for the purpose of prosecuting the explorations and surveys incident to its construction. These explorations and surveys have been effected during the late season under the direction of Capt. W. G. Williams, a gentleman distinguished by science and the possession of every acquirement requisite for the faithful and able execution of the duty entrusted to him. We are happy to state that Capt. Williams' survey furnishes the most gratifying results in respect to the practicability of the work, and the facilities for its execution. His report will be submitted to Congress early in the ensuing session.

We therefore avail ourselves of the opportunity to inform you that Memorials to Congress, praying for the construction of the Canal as a National work, and for an appropriation therefor, will be presented at the ensuing session, from many parts of the State of New York, and would respectfully submit to you the expediency of sustaining these Memorials by others from your section of the Union.

We are of opinion that no constitutional objection will interpose to prevent an appropriation for this great object. It is a matter of great national interest as a military work, and is in immediate connection with the constitutional power expressly granted to Congress for the regulation of commerce between the States, with foreign nations and the Indians tribes; for to all these would the removal of the barrier of the Falls of Niagara afford immense facilities.

It is our fellow citizens of the West, whose trade is tributary to the Lakes, who are most immediately and extensively interested in the proposed improvement. Its value to them can in some measure be ascertaind from the results of the intercourse now subsisting between the Port of Oswego, on Lake Ontario, and the Ports upon the Upper Lakes by means of the Welland Canal. About 25,000 tons of merchandize have been shipped for the West from the city of New York during the present year, and have passed westward through the Ports of Buffalo and Oswego. Of this amount about 20,000 tons have been shipped from Buffalo, and about 5,000 tons from Oswego.

Supposing the whole 25,000 tons had passed through either Port, the rates of transportation charged by the forwarders of Oswego and Buffalo furnish the following results:

Freight of 25,000 tons of merchandize from New York via Buffalo to Cleveland.

Usual freight, 1835, $1.13 per 100 lbs. for heavy goods; do do $1.29 do light do. Average freight $1.20 per 100 lbs. or $24 per ton, amounts to - - -	$600,000
Freight of 25,000 tons from New York via Oswego to Cleveland.	
Usual freight, 1835, 60 cents per 100 lbs. for heavy goods; do do 75 do light do. Average freight 67 cents per 100 lbs. or $13.40 per ton, amounts to - -	$335,000
Difference in favor of the Oswego route,	$265,000

Freight of 25,000 tons of merchandise from New York via Buffalo to Chicago.

Usual freight, 1835, $1 50 per 100 lbs. for heavy goods, do. do. $1 70 do for light goods, Average freight $1 60 per 100 lbs. or $32 per ton, amounts to	$800,000
Freight of 25,000 tons from New York via Oswego to Chicago.	
Average freight charged this year, $1 05 per 100 lbs. or $21 per ton, amounts to	$525,000
Difference in favor of the Oswego route,	$275,000

It is found from experience, since the completion of the Erie Canal, that the transportation westward quadruples in the period of five years. In 1840 then, the amount of Western freights will be 100,000 tons.

The charge upon this at present prices, by the Buffalo route, would be to Cleveland,	$2,400,000
By the Oswego route to Cleveland,	1,340,000
Difference in favor of the Oswego route,	$1,060,000

It is reasonable to estimate that the transportation Westward in 1845, will be 250,000 tons. The difference between the Oswego and Buffalo routes will always maintain the same proportions. At the present prices, the difference in favor of the Oswego route to Cleveland on 250,000 tons would be $2,650,000

On same to Chicago, 2,750,000

The justice of these estimates we refer to yourself, and shall draw no inferences from them. We would merely remark, that whatever the difference is, will be *an annual charge* upon the enterprize and industry of the West. Neither shall we detain you by any remarks upon the immense influence which an uninterrupted navigation from Lake Ontario to the upper Lakes will necessarily have upon the value and the settlement of the public lands.

The object of this communication is, to request your aid and influence in behalf of the projected canal, and we would respectfully submit to you the expediency of calling meetings of your fellow citizens, of expressing your views to your Representatives, and presenting memorials to Congress, asking the requisite appropriations for the execution of the great national work in contemplation.

With great respect, Sir, we are,
Your most ob't serv'ts,

C. J. Burckle,
G. H. McWhorter,
M. P. Hatch,
A. P. Grant,
J. N. Bonesteel,
Wm. F. Allen,
Corresponding Committee.

Erie Canal.—As the enlargement of the Canal is about going into effect, is it not expedient to inquire, whether its route cannot be judiciously rectified in some parts?

Great complaint has always been made against the section between Schenectady and Albany.—The direct route between those cities is but 15 miles, and yet the Canal is 30 miles in length and crosses the Mohawk twice between Schenectady and the Hudson. Cannot that great circuit be avoided? The table land between the Mohawk and the Hudson descends upon an average from 12 to 20 feet on the mile from the former to the latter river, and as it is but little more than 100 feet high at Schenectady, it might be cut through at a small expense, until the level line of the Mohawk was brought to the top of the table land in its descent to Albany. If one of the ravines on the Mohawk side, or the Sandkill valley, should be taken for the route, the expense would be lessened.

The annual saving on the canal navigation would soon pay the expense. There are now between 30 and 40,000 canal boats arriving and clearing at the Hudson annually. The saving to each boat in tolls for 15 miles canal travel would be $7 and as much for returning, and the wages and expenses for the time saved in 5 hours each would be at least one dollar per boat.

An annual saving therefore of between two and $300,000 would be made by thus rectifying this part of the eastern section of the canal, besides rendering the canal itself more secure—the route being entirely inland instead of crossing and re-crossing the Mohawk by aqueducts. Does not this subject deserve a full investigation?

It may be matter of news to some of our readers, to say, that it is in contemplation to straighten the canal a little east of this city, by cutting through the hill near Gideon Cobb's, and that the survey has already been made and the location staked out.—[Rochester Democrat.]

[From the New-York American.]

Our Harbor.—The survey of *Sandy Hook Bar*, which has been made by Lieut. *Thos. R. Gedney*, of the United States Navy, and others, by order of *F. R. Hassler*, Esq., Superintendent of the U. S. Coast Survey, has been completed this season, and was, a day or two since, exhibited to the Chamber of Commerce.

By this survey, a new channel over the Bar has been discovered, having *23 feet water at the lowest tides*, and it is hoped measures may be taken by the merchants, and insurance companies, to have this channel buoyed out, early in the spring.

The manner in which the survey of the coast has been carried on, since the appropriation in 1832, will reflect lasting credit on the country; and the determination of the administration to carry on a proper triangulation of the whole coast, will save millions to the country, while it will enrol the names of its supporters among those to be remembered with gratitude by the commercial community, now, and in time to come.

The proper determination of points along the coast has been long a desideratum, and the impossibility of carrying on a survey of any extent, without a triangulation, is now established. Hence, notwithstanding the sums of money heretofore spent in surveys by Government, there are not, it is said, half a dozen points on our coast, the lat. of which is known with the accuracy that may be attained.

The labor, time, care and skill, requisite to conduct such a survey as that of this harbor alone, can only be judged of, by those who examine, as we have had the opportunity of doing, the result as laid down on a chart; and we repeat the expression of our hope, that the merchants and insurers of this city will cause it to be engraved and published forthwith. The sale of the charts would soon indemnify the cost of publication, to say nothing of the diminution of risk to property and life, which it would certainly effect.

[From the same.]

The American Journal of Science and Arts, conducted by Benj. Silliman, M. D. LL. D.—October. New-Haven, H. Maltby and Herrick & Noyes. New-York, G. & C. Carvill & Co.—This number is almost entirely given up to an account of the coal formation of the Ohio and its confluent rivers, by Dr. S. P. Hildreth, of Marietta, Ohio. The mass of information, of curious results, and magnificent realities, embodied in this paper, makes it one of great interest—even to unscientific readers. There are annexed to the account several pages of woodcuts, representing accurately the various fossil remains found in the coal beds, and occasionally portions of the striking scenery amid which these beds are stretched far and wide.

Personally, we read this paper with the more interest from having last Spring passed over a portion of the region described in it, and been struck with the prodigality of nature in her gifts to it. The annexed account will, we are sure, be new, as well as interesting to many of our readers.

The Bituminous Coal Fields of Pennsylvania.—Nature, in the disposition of her bounties, seems to have bestowed upon Pennsylvania, more than a due proportion of the treasures of the mineral kingdom. Great and valuable as are her anthracite deposits, and rich and abundant as are her mines of iron ore and other minerals, her bituminous coal region is still more extensive and inexhaustible. The great secondary deposit, extending as is generally believed, from the Hudson to the Mississippi, and to the Rocky mountains, is in Pennsylvania limited by the Alleghany mountains, which appear to form the barrier, or dividing line between the anthracite and bituminous coal beds, or between the transition and secondary formations. The union or junction of these formations is plainly and distinctly marked in the end of the mountain, where the west branch of the Susquehanna breaks through it, above Bald Eagle, the latter resting against the former, and forming the basin in which the bituminous coal, in regular and successive strata, is deposited. The coal field is therefore confined to the west side of the Alleghany, and is supposed to extend to the centre of the mountain. In the S. E. corner of Somerset county, and in the western parts of Bedford and Huntingdon counties, it would appear to extend to the S. E. of what is there called the Alleghany, and occurs in great abundance on Wills' creek, Jen-

nings' creek, &c. emptying into the Potomac. The chain of mountains called the Alleghany above Bedford, is very wide; and large mountains diverge from it, and although the mountain ranging through Somerset and dividing the waters of Youghiogana and Conemaugh, from those of the Potomac, may be the largest, it seems most probable that Wells or Evetts, or possibly Sideling mountain, there forms the boundary of these deposits, and upon examination will be found to exhibit a continuation of the same characteristic features between the secondary and transition formation."

The bituminous coal beds, vary from one foot to twelve feet in thickness, but rarely exceed six feet. They lie in nearly horizontal strata, with about sufficient dip to free the mines from water—some hills contain *three and four* beds, with alternate layers of earth and slate, and rest between a firm and smooth slate roof and floor. *Faults* or *troubles* are seldom met with, and in this they differ from the anthracite, and go far to confirm the opinion, that all this vast extent of secondary rocks, was once the bottom of the great lake or sea, and that it suffered little if any interruption from the gradual discharge of its waters, through its distant and widely extended boundary. It has evidently been drained by the Mississippi, the St. Lawrence, the Susquehanna and the Hudson; and it is a curious and interesting fact, that near the northern termination of this coal field, in Potter county, the head waters of the Alleghany, the Susquehanna and the Genesee rivers, flowing into the gulf of Mexico, the Chesapeake and the St. Lawrence, take their rise in an area or space of about five miles.

With the exception of the Susquehanna and its tributaries, and Wills' creek, emptying into the Potomac, all the streams rising in the coal field, west of the mountains, flow into the lakes, or into the Ohio river, and consequently the ground falls off or recedes in the same direction, and becomes too low, as is generally supposed, to contain the coal measures. Its northern termination or boundary may be traced from the head waters of the Towanda creek, in Bradford county, thence across the high lands or dividing waters of Tioga, Potter, McKean, Warren, Venango, &c., to the Ohio State line.—The Tioga river and its tributaries penetrate the coal field in the vicinity of Blossburgh and Wellsborough in Tioga county. A recent and interesting mineralogical report, upon this region, has been made, by R. C. Taylor, a practical engineer and geologist, for the Blossburgh Railroad Company, in which it is satisfactorily shown that the coal runs out as the streams decline to the north.—"There would need," says the report, "a total height of mountains of five thousand, one hundred and twenty feet, at the State line between New York and Pennsylvania, to contain the coal measures, whereas the hills, there, are probably below six hundred feet in altitude. This calculation is entered into with a view of showing the futility of the expectation, not uncommonly expressed, of tracing these coal fields in a northerly direction beyond the limits at which they are at present discoverable."—"This field being bounded on the south by the Alleghany mountain, extending into the State of Virginia, and westward; coal may be said to be present, to a greater or lesser extent, in all the western counties, with the exception of Erie, in which it has not been discovered. The counties of Bradford, Lycoming, Tioga, Potter, McKean, Warren, Crawford, Bedford, Huntingdon and Centre, lie partly in and partly out of the coal field. The counties of Alleghany, Armstrong, Beaver, Butler, Cambria, Clearfield, Fayette, Greene, Indiana, Jefferson, Mercer, Somerset, Venango, Washington and Westmoreland, are wholly within its range, and embrace together an area of *twenty-one thousand* square miles, or *thirteen millions four hundred and forty thousand acres.*" Coal has been used for fuel and manufacturing purposes, west of the mountains, from the earliest settlement of the country. It is mined, to a greater or less extent, in all the above counties, at the rate of one cent and two cents per bushel, and is thus brought within the means of all, and literally to every man's door—abounding throughout all this vast extent of territory, and fitted and used for almost every purpose requiring heat, it is impossible to form any thing like a correct estimate of the quantity consumed yearly, and sent to market. That its great abundance and cheapness have given birth to the vast and widely extended manufacturing establishments of the west, there can be no doubt. Without coal they could not exist. It constitutes the life spring of Western Pennsylvania, and the pedestal of our great manufacturing emporium.—Pittsburgh and its environs contain ninety steam engines for the various manufactures of iron, steel, glass, cotton, salt, brass, white lead, flour, oil, leather, &c. These engines consume two millions sixty-five thousand three hundred and six bushels a year. The city of Pittsburgh and its suburbs, Alleghany town Birmingham, &c., contain a population of thirty thousand souls. "The coal consumed for every purpose, in and about Pittsburgh, is estimated at seven millions six hundred and sixty-five thousand bushels, or two hundred fifty-five thousand and five hundred tons—at four cents per bushel, the price now paid in Pittsburgh, it would amount to three hundred and six thousand five hundred and twelve dollars." "The coal consumed in the manufacture of salt, in the western counties is very great. There are on the Alleghany, Kiskiminitas, Connemaugh, Crooked creek, Mahoning, Saw mill run, Brush creek, Sewickly, Youghiogany and Monongahela, about ninety salt manufacturing establishments and many others about going into operation. These establishments produce yearly about one million bushels of salt and consume five millions of bushels of coal."—'The coaking process is now understood, and our bituminous coal is quite as susceptible of this operation, and produces as good coak, as that of Great Britain. It is now used to a considerable extent by our iron manufacturers in Centre county and elsewhere."

These facts, elucidating the immense mineral wealth of the "valley of the Ohio," open to the imagination a long vista of power and greatness, which the utmost stretch of the imagination is hardly able to equal.

The *Cannel Coal* has as yet only been found in the vicinity of Cambridge, Guernsey Co., Ohio, though it is supposed also to exist about the head waters of the Muskingum, considerable masses of it having been picked up on the banks of that river, brought down by the current. We were not before aware that this most brilliant and combustible of coals had been found at all in the United States.

There is a vast amount of information in this paper, to which we would desire to advert, but know not what to select, and therefore confine our extract—having begun with coal—to the subjoined speculation upon

Coal Deposits.—The immense beds of bituminous coal found in the valley of the Ohio, fill the mind with wonder and surprise, as it reflects on the vast forests of arborescent plants required in their formation. Age after age, successive growths of plants, springing up in the same region, were entombed beneath thick strata of shale and sandstone, until the whole series had accumulated to a depth of more than a thousand feet: while beneath the whole, lay the bed of an ancient ocean floored with fossil salt. Indications of coal are found at intervals, across the great valley, from the Alleghany to the Rocky Mountains. It is found near the surface in Kentucky, Ohio, Indiana, Illinois and Missouri, and without doubt, may be found beneath the extensive territory deposits, which form the substratum of the great prairies in the central and northern parts of the western States. As low down as New Madrid on the Mississippi, coal was thrown up from beneath the bed of the river, by the great earthquakes of 1812—a sufficient proof of its continuation in the most depressed part of the great valley.

That coal is of vegetable origin, no one who has read much on the subject, or personally examined the coal beds, will now deny. Time was, when it was considered a peculiar mineral product, formed in the earth in the same manner and at the same time with the rocks that surround it. The product of its chemical analysis, being altogether vegetable, and the artificial formations of coal from wood by Sir James Hall, have silenced all doubts on the subject. The only mystery now is, how such vast quantities of vegetable matter could be accumulated and grow on the spot where they were buried. That they grew in general, on the surface now occupied by the coal, appears certain from the perfect state in which the most delicate leaves and stems are preserved. Had they been transported by currents of water, and especially from any distance, it is hardly possible that they should not have received more damage. The climate, at that period, must have been both more warm and more humid than at present, as many of the plants are of those families which now grow only in tropical climates; and as the laws of nature never change, this may be deemed a correct inference. A similar climate seems to have prevailed in the latitudes north of 30°, both in Europe and in America, many of the same plants being common to the coal strata of both countries, as will be evident by comparing the drawings of several of the species found in the valley of the Ohio, with those exhibited by M. Brongniart, in his work on "Des vegetaux Fossiles," of the European coal beds. South of lat. 30°, but few coal deposits are found, the climate requiring but little fuel for the comfort of the inhabitants; but north of that parallel, many districts could be but very thinly inhabited, or perhaps not at all, were it not for the wonderful provision of coal laid up in the bowels of the earth for the use of its inhabitants, after the forests were destroyed to make room for cultivation.

The coal deposits of Britain, by nourishing her manufactures, which have raised her to her present proud attitude among the nations, are the principal source of her present greatness.

In the valley of the Ohio, some of the coal beds, were covered with marine deposit; in others the deposit was made in fresh water, as is demonstrated from the character of the fossil shells found in the rocks, both over and under the coal. In what manner these changes were brought about, remains for future geologists to determine, after the science has become mature.

Where not removed by degradation, or buried under other strata, there seems to have been three distinct deposits of coal throughout the main coal region, embraced on the map, which accompanies these observations. After the vegetable materials which form the coal beds, were deposited or buried under the superincumbent strata, it would seem that a strong degree of heat had been applied, in addition to the pressure, before they could assume their present bituminized appearance. As we approach the coal beds, in the transition and primitive rocks, the evidences of heat are still more apparent; removing from the anthracite beds, all, or nearly all their bituminous contents; and in the primitive, changing anthracite into graphite, or plumbago, which is almost pure carbon. It would appear, that we cannot reasonably doubt the action of heat on these coals, for the plumbago is evidently a coal, changed by heat into its present semi-metallic appearance, and is often produced in the furnaces of the arts, by the action of heat upon carbon. A less degree of heat has been applied to the bituminous beds of "the Valley of the Ohio," for they are far removed from any crystalline or transition rocks, on which the marks of heat are so apparent, and therefore could not receive a sufficiency to deprive them of their bituminous principles and change them to carbonaceous coal beds. The suggestion advanced by many geologists, and recently applied by Prof. Hitchcok, in his geology of Massachusetts, that graphite, anthracite and bituminous coals are all of vegetable origin, and changed by heat and pressure to what they now are, is a simple and beautiful illustration of a heretofore obscure and difficult subject.

Internal Improvement Convention at Utica.—A public meeting was held at Brooklyn on Friday evening, at which ten delegates were appointed, on behalf of Brooklyn and Long Island at large, to attend the Convention at Utica. The following gentlemen were named, with power to supply any vacancies:—Gen. Jeremiah Johnson, Joseph G. Swift, John Lawrence, Alden Spooner, Henry F. Pierpont, Benj. D. Silliman, Geo. Hall, Edward Copland, Amasa Wright, Clarence D. Sackett.

"We know that a very active and extensive business is carried on in this city, in the article of *oysters*, destined for the consumption of the people west of the Alleganies, but we were not aware, until we saw the fact mentioned in a western paper, that it had become so large as to justify the establishment of a regular line of wagons to Pittsburg, for the transportation of oysters exclusively."

The above paragraph, from the Baltimore American, relates an extraordinary fact, but one of which there is, we apprehend, no doubt. We were tempted, last April—being casually in Cincinnati—by the novelty of the thing, at such a distance from the seaboard, to eat some oysters from the shell: they were not injured by the long transportation over mountain and valley, and were sold at not more than double the price paid in this city.

[From the Journal of the Franklin Institute.]

Replies to a Circular in relation to the Occurrence of an unusual Meteoric Display on the 13th of November, 1834, addressed by the Secretary of War to the Military Posts of the United States, with other facts relating to the same question. By A. D. Bache, Prof. of Nat. Philos. and Chem., Univ. Penn.

(Communicated by the Author.)

Having found that the inference drawn from my observations on the morning of the 13th of November, 1834,* at Philadelphia, was directly opposite to that to which Professor Olmsted had been led, from his observations at New-Haven, I felt naturally desirous to determine what might have been the extent of country over which the unusual display of meteors seen at New-Haven had taken place, this extent having a direct bearing upon the question of the nature of the phenomenon. At my request, communicated through the kindness of the Chief Engineer, the Secretary of War, Gov. Cass, issued a circular to the commandants of the different military posts of the United States, requesting to be informed whether any unusual meteoric display had been witnessed at their respective posts, on the morning of the 13th of November, 1834.

The results of this inquiry, I propose now to put upon record, in as brief a manner as possible. The arrangement adopted in the record, is to begin with the most northern post on our north-eastern frontier, to pass southward along the Atlantic board; then beginning with the most southerly post of the western chain, to pass northward along that chain, then eastward on the northern frontier, towards the original point of departure. Along this line, the display of November 13th, 1833, attracted universal attention.

From Hancock Barracks, Holton Plantation, Maine, Maj. Clarke reports that no recurrence of the meteoric phenomenon of 1833, was observed on the 13th of November, 1834.

A similar report is made by Maj. M'Clintock, in relation to Fort Preble, Portland, Maine, and its vicinity.

No unusual meteoric phenomenon was observed at Fort Constitution, Portsmouth, New-Hampshire, as stated by Maj. Ansart; nor at Fort Trumbull, New-London, Connecticut, as stated by Maj. Saunders; nor at Fort Hamilton, New-York Harbor, according to the report of Maj. Pierce; nor at Fort Severn, Annapolis, Maryland, according to Maj. Walbach; nor at Fort Washington, Potomac river, below Washington city, according to Maj. Mason.

Maj. Churchhill states that at Fort Johnston, Smithville, North Carolina, no unusual meteoric appearrances were noted on the evening referred to in the circular, but that no one was particularly engaged in watching for a recurrence of the meteors of 1833.

Maj. Gale reports from Fort Moultrie, Charleston Harbor, that he can find no one in the garrison, or its vicinity, who has seen any unusual meteoric display since November, 1833; and the report of Lt. Williamson, from Castle Pinckney, in the same harbor, is to the same effect.

Capt. Marchant makes a similar report from Fort Oglethorpe, Savannah, Georgia.

From Fort Marion, St. Augustine, East Florida, Capt. Drane reports that no recurrence of the meteors had been observed, and that no remarkable meteorological occurrence was recorded about the period designated, in November.

No recurrence of the meteors was observed at Fort Jackson, on the river Mississippi, below New-Orleans, commanded by Capt. G. M. Gardiner.

General Atkinson states from Jefferson Barracks, near St. Louis, Missouri, that no occurrence of the sort alluded to in the circular, was observed in the autumn of 1834, by "any one at the post, nor was there such a recurrence any where in the west, as far as [his] inquiries, had extended."

Lieut. Col. Vose reports from Fort Towson, on the Red river, below the mouth of the Kiameche, that no recurrence of the meteors had been observed, as far as he could learn, in the section of the country in which the post is situated.

Col. Dodge, commanding the regiment of dragoons, reports from Fort Leavenworth, on the Missouri river, at the junction of the Little Platt, that no remarkable meteoric phenomenon had occurred since his arrival at the post, on the 27th of September; he adds, that "a recurrence of an event so remarkable as the one mentioned, could not have escaped the notice of the sentinel on post."

From Fort Snelling, Falls of St. Anthony, Upper Mississippi river, Maj. Bliss reports that, from an examination of the sentinels who had been on post during the night of the 12th and 13th of November, he could not learn that any recurrence of the meteoric phenomenon of 1833 had been observed. He gives a particular account of a very bright meteor seen at 5 o'clock, A. M. on the morning of the 9th of January, 1835.

Lieut. Col. Davenport, commanding at Fort Armstrong, Rock Island, Upper Mississippi river, Illinois, states, as the result of information which is satisfactory to him, that no meteoric phenomenon was observed on the 13th of November, 1834, at his post. He gives the temperature at 7 o'clock, A. M. on the 13th of November, as 42° Fah., the wind N. E., and the weather fair.

The reports from Fort Dearborn, Chicago, Illinois, commanded by Maj. Green, and from Fort Winnebago, portage between the Fox and Ouisconsin rivers, N. W. Territory, commanded by Lieut. Col. Cutler, state that no unusual meteoric display was noticed there on the night referred to.

The return from Fort Howard, Menomoniveille, Michigan Territory, is of the same purport, General Brooke adding, that there were several apparent shocks of an earthquake in Movember, 1834, as evidenced "by a severe rocking of the flag-staff in the night, although it was perfectly calm at the time."

From Fort Mackinac, Straits of Michilimackinac, Michigan Territory, Capt. Clitz reports that he has "made inquiry of the sentinels who were on post on the night of the 13th of November last, and *one* only, an intelligent young man, who was posted at the north angle of the fort, saw a shower of meteors in the north, between 12 and 1 o'clock, the duration of which, as near as he can recollect, was about one hour."

Maj. Hoffman reports from Fort Gratiot, on the St. Clair river, that no recurrence of the meteoric phenomenon of 1833 was observed at his post.

The returns just given are from eleven posts in the Atlantic States, from Maine to East Florida; from six posts in the Western States, or frontier, and from five on the northern frontier; they agree in stating, with one exception, that no unusual meteoric display was noticed on the night of the 12th, 13th of November, 1834.

It is almost needless to observe, that the military stations are places where observation of any striking meteoric phenomenon may be expected, at least one sentinel being on post, the reliefs being posted by a non-commissioned officer, and the sentinels visited at least once during the night by a commissioned officer. Vigilance is particularly to be expected in our out-posts, from which the reports are quite minute. A local "shower" of meteors was observed by a sentinel at Fort Mackinac, about midnight, and lasting about one hour. Many of the reports do not confine themselves to a statement that no meteoric display was witnessed at the posts, but include inquiries made in the vicinity.

These reports may, I think, be considered conclusive against the occurrence of any extensive and remarkable display of meteors, so far as ordinary observation could have detected such a display.

In reply to letters addressed to friends in different quarters, with a view to ascertain if special observation had been made on the morning of the 13th of November, I received the following information.

At New-York, as I learned from Prof. Renwick, a gentleman well known for his scientific attainments, assisted by a friend, watched the during whole night, but saw no remarkable occurrence of meteors. Doctor Gibbons, of Wilmington, Delaware, observed the heavens, in connexion with his observations on the aurora, until about half-past 12 o'clock on the morning of the 13th of November. He informs me that he has been in the habit of inspecting the heavens, frequently, every clear evening since November, 1833, and has observed, often, an unusual number of meteors, for several evenings in succession, and sometimes the reverse of this. The night of the 12th, 13th of November, 1834, was clear.

No unusual occurrence of meteors was noticed at Baltimore by the city watch, or

* See Am. Jour. Sc. & Arts, by Prof. Silliman, for January, 1835, p. 335.

others, to whom inquiry was directed by Prof. Ducatell; nor at the University of Virginia; nor at the University of North Carolina; at which places, as I learn from Prof. Patterson, and Prof. E. Mitchell, no special observations were made. At Cincinnati, Ohio, the night was cloudy, with showers.

President Lindsley, of Nashville University, informs me that one of the gentlemen of the University was on the look-out on the night of the 12th, 13th, but saw nothing remarkable.

The direct observations made at New-York, Philadelphia, and Nashville, show that no unusual meteoric display occurred at either of these places; and the general experience at Baltimore, and Wilmington, Delaware, the University of Virginia, and the University of North Carolina, was to the same purport. As far as public testimony through the journals can reach this point, it confirms these conclusions.

I infer that the meteors seen at New-Haven, from one o'clock until daylight, by Prof. Olmsted, and the gentlemen who assisted him; at West Point, after 2, A. M. by Mr. Twining; at Mackinac, between twelve and one o'clock, by the sentinel, were not parts of one meteoric display, visible over an extensive region of country, like the phenomenon of November, 1833, but were local.

It is to be seen from the foregoing statements, that the weather was not the same over the extent of country which they embrace, while on the 13th of November, 1833, there was a most remarkable uniformity over a much greater surface.

Philadelphia, May 28, 1835.

[From the Repertory of Patent Inventions.]

Specification of the Patent granted to HENRY BOOTH, *of Liverpool, for Compositions or Combinations of Materials applicable for the Greasing of the Axle-Bearings of Carriages, and the Axle-Spindles and Bearing-parts of Machinery in general, denominated Patent Axle-Grease and Lubricating-Fluid.*

Mr. Booth says, my patent axle-grease and lubricating-fluid are chemical compounds of oil, tallow, or other grease, and water, effected by means of the admixture of soda or other alkaline substance, in such proportions that the compounds shall not be of a caustic or corrosive nature when applied to iron or steel, but of an unctuous greasy quality, easily fusible with heat, and suitable for greasing the axle-bearings of carriage-wheels, or the axles, spindles, and bearings of machinery in general. And the proportions of the ingredients for the said compounds, and the method of compounding them, which I recommend as suitable for the above purposes, are as follow:—

For the axle-grease suitable for carriage-axles, and particularly for the axles of every description of railway carriages, a solution of soda in water, (the common washing soda of the shops,) in the proportion of half a pound weight of soda to a gallon of pure water; to one gallon of this solution add three pounds of good clean tallow and six pounds of palm-oil; or, instead of the mixture of tallow and palm-oil, add ten pounds of palm-oil, or eight pounds of tallow, (the tallow being of a stiffer nature than palm-oil.) The said tallow and palm-oil, or either of them, and the solution, as described, must be heated together, in some convenient vessel, to about 200° or 210° of Fahrenheit, and then the whole mass must be well mixed and stirred up together, and be agitated without ceasing till the composition be cooled down to 60° or 70° of Fahrenheit, and have obtained its consistency, which will be that of grease or butter, in which state it will be ready for use, and may be applied in the way in which grease is usually applied to machinery.

For the lubricating-fluid, which, also, is applicable to the rubbing parts of machinery, (and particularly to the spindles of pulleys on inclined planes moving on wooden bearings,) I recommend to be taken of the aforesaid solution of soda in water, one gallon; of rape-oil, one gallon; and of tallow or palm-oil, one quarter of a pound weight: heat them together to 200° or 210° of Fahrenheit, and then let the fluid composition be well stirred about and agitated without intermission till cooled down to 60° or 70°, when it will be of the consistency of cream: or if a thicker consistency be desired, a small addition to the tallow or palm-oil may be admitted; and in all cases it is advantageous to shake or stir up the mixture immediately before using it.

Now, though I have given the foregoing proportions of ingredients, as suitable, under ordinary circumstances, I do not mean to limit the invention to these precise mixtures; as according to the temperature of the weather, or the particular purpose to which it may be applied, a little more tallow or other grease or oil, and less of the solution may be desirable; or slight alterations in the quantity of soda for the solution, or in the relative proportions of tallow and palm-oil or other grease, may be found advantageous—a larger proportion of soda in the solution, and a larger quantity of tallow in proportion to the solution, rendering the compound stiffer, and less easily fusible in hot weather; all which modifications of my patent compounds will be easily adjusted by the superintendents of the machinery to which they may be applied. In witness whereof, &c.

Enrolled June 4, 1835.

[From the same.]

Specification of the Patent granted to JOSEPH FERGUSON, *of the City of Carlisle, in the County of Cumberland, Manufacturer, for a certain Combination of Processes whereby a new kind of Dress or Finish is given to certain Goods.* Sealed December 23, 1834.

To all to whom these presents shall come, &c. &c. *Now know ye*, That in compliance with the said proviso, I, the said Joseph Ferguson, do hereby declare the nature of my said invention to consist in giving a new kind of dress to twilled, plain, or figured cotton goods, which have been beetled by submitting them to certain known processes, not heretofore applied, after beetling, to produce that effect. And in further compliance with the said proviso, I, the said Joseph Ferguson, do hereby describe the said processes and the order in which the same are to be applied, by the following statement thereof, (that is to say):

I take plain, twilled, or figured cotton cloths beetled in the usual way by a beetling-machine for fifty or sixty hours, in order to bring them to a very high gloss, and put them over a damping-machine so as to be completely saturated with water. I then put them through a drying-machine with copper cylinders and heated with steam in the usual way, taking care to put them through, when twilled, as tight as the cloth will bear without tearing, so as to open out the twill as much as possible during the drying process; when the cloths are plain, or figured, only, and not twilled, then the usual degree of tension applied to goods in drying-machines will be sufficient, and in all cases it is preferable that the heat and speed of the drying-machine be such as to dry the cloth completely by the time it gets once through, provided the color, (if dyed goods,) be such as to admit of it, if not, it should be dried at two or more operations.

The stiffening of the goods should in all cases also be particularly attended to, inasmuch as the more firmly they are stiffened, whether before or after beetling, the more defined and perfect will be the dress.

Now whereas I claim as my invention the combination of the damping or saturating and subsequent drying processes with the process heretofore in use to produce beetled goods, as hereinbefore described, and applied to the purpose of giving a new kind of dress or finish to such goods as aforesaid. And such my invention being, to the best of my knowledge and belief, entirely new and never before used within that part of His said Majesty's United Kingdom of Great Britain and Ireland called England, His said dominion of Wales, or town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same, and that I do verily believe that this my said specification doth comply, in all respects, fully and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained; whereof I do hereby claim to maintain exclusive right and privilege to my said invention. In witness whereof, &c. Enrolled June 23, 1835.

BUFFALO, Nov. 5th.—NINE STEAMBOATS, and a large number of schooners, left this port on Tuesday, for the West, heavily laden. The tide of emigration, and flood of merchandise to the West, is unprecedented, and scarcely shows a diminution from the thousands, which passed through our city at the opening of navigation, last spring.

A SHEET IRON STEAMBOAT has been placed on the Erie Canal, and has succeeded admirably, so far as the experiment has been tried. She is propelled at the rate of six miles an hour without causing any injury to the Canal. [Courier and Enq.]

AGRICULTURE, &c.

Extract of a Letter from our Correspondent, A. W., dated,

Lansingburgh, 27th August.

Business calling me to New-York, about the middle of June last, and not having completed it on the first of July, and finding, from appearances, that little could be done, till after the celebration of the Fourth of July, I took the opportunity to make an excursion of two or three days to Philadelphia.

Stepping on board the morning six o'clock boat, I was enabled, by a rapid, but pleasing and changeful travel, by land and water, to reach Philadelphia in time for dinner at the United States Hotel. Some people live to eat, and others eat to live; and as I belong to the latter class, I did not pounce my eye on the preparations for dinner in the spirit of a *gourmand*. I merely noticed the profusion of viands on the table, but I could not help, being a stranger, observing the superiority in good, wholesome, well-baked bread, fresh vegetables, and choice butter.

When dinner was over, I took a walk to the Navy Yard. The first impulse was, of course, to find something new, and worthy of inspection. With very little search, I found an object which answered the purpose. This was the new national ship, Pennsylvania, of 140 guns, now on the stocks. It was my good fortune to meet with a gentleman who was probably an officer of some grade, at any rate, I think he was worthy to be one, at least as far as politeness is concerned. He showed me, with an apparent feeling of national pride, every thing connected with it, and answered all my questions, not only with a thorough knowledge of the subject, but with seemingly as much pleasure as I could possibly take in asking them. I took minutes from some of his answers, and among the principal ones I find the extreme length of the ship is 217 feet, its greatest breadth 59 feet, and its depth, amidships, 51 feet. But as naval architecture is not my object, though I took several other notes, I will not tax the printer nor the reader with them. As I had another use for the remaining part of the afternoon, I took a rather painful leave of my interesting guide, reflecting, at the same time, with what wonderful accuracy the sweet and bitter of life are balanced; for the extreme pleasure I took with this momentary acquaintance, was exactly balanced by the pain of parting.

I now steered my course to Washington Square, a fine specimen of taste and liberality. It is situated in the southeasterly part of the city, and I was told that it contains about eight acres. It is beautifully laid out, and planted with ornamental trees, selected from various parts of the world, but, as they should be, mostly natives of our own continent; for certainly, while the Eastern Continent can boast of its ancient ruins, its broken columns, and relics of the arts of other days, now trodden under foot, and crumbling into dust, the proper field, in which to search for the beauties of nature, and to explore her inmost recesses, will be found in the forests of America. The sun was now descending far in the west, and its light striking in bold relief on the trees and flowers, and reflected from different shades of green, presented a scene beautiful beyond description.

The city contains several other spacious and beautiful squares, but I had not time to visit them. Why is it that our other cities and villages are destitute of these delightful appendages? No reason can be given, but that they were laid out, as we know was the case in the early settlement in our own State, without any plan at all, or the ground has been seized on, and sold in speculation, to gratify the sordid views of forestallers.

> When thirst of gold enslaves the mind,
> And selfish views alone bear sway,

every nobler feeling—every spark of laudable national pride vanishes, as colors vanish when light is withdrawn.

The dusk of evening was closing around me, and I returned to my lodgings. The day's exercise had given me an appetite for a wholesome supper, and a night of quiet repose, both of which were duly enjoyed.

At daylight next morning, I took a stroll through the market, and was soon convinced that its celebrity was justly merited. The building and accommodations were in themselves highly worthy of notice. Stretched nearly a mile in length, through the middle of a wide avenve, which is a great thoroughfare through the centre of the city, from one river to the other; and forming, on each side of it, a street of convenient width. Its plan, for beauty and convenience, could scarcely be improved. But to give an idea of the contents of this market, all I can say, from so short an inspection is, it contains samples of every thing which ever was, or can be exhibited for sale in a public market. The meats in general were fine, but the mutton, in particular, surpassed any display of that article I have ever seen. The butter was exhibited in a style of neatness and taste, which would draw tears of pleasure in the eyes of an Epicure. But it was not these more prominent articles only which attracted attention; every thing the eye could recognize, animal, vegetable, mineral, or fossil—natural or artificial, was there, and all so tastefully arranged, that the smallest article seemed to say, examine me too; while the choice fruits, flowers, and fresh vegetables, whispered, with more conscious dignity, here you may see the effect of liberal premiums from the Pennsylvania Horticultural Society.

After breakfast, taking all the rest of the day before me, I set out to view the gardens, water-works, &c.; and, taking a hackney coach, my first course was steered to Bartram's Garden and Nursery. These are situated on the west bank of the Schuylkill, about three miles from the city, and ar now owned, and judiciously managed, by Mr. Robert Carr, the son-in-law of Mr. Bartram, who is well known as a botanist and naturalist; and his very superior collection of North American trees and plants, show him in the very pleasing light of being truly national.

On a stone over one entrance to the house, I noticed the date of 1731, rather roughly but plainly cut. On inquiring, I found that this front of the mansion was built at that period; and another inscription, purporting to have been cut 39 years afterwards, reads and spells thus:

> "It is god alone almyty lord
> The holy one by me adored.
> "JOHN BARTRAM, 1770."

The garden, it is said, was commenced about four years before the date of the first inscription, and is now about 114 years old. I was informed that Mr. Bartram and his son must have been about 100 years in collecting this valuable legacy they have left to the Flora of North America. A small strip of land, containing less than seven acres, was said to contain rising 2,000 species, natives of our own country. But I found also a no less rich treat in examining the exotics, which were very numerous and valuable. The collection of Camillas and tropical plants, surpassed any thing of the kind I had ever seen; among the latter were some fine specimens of Zamias, Ficus, Euphorbia Hetirophylla, &c. The grounds were tastefully laid out, and besides the amazing variety of smaller trees and shrubs, arranged, apparently, to the best possible advantage, the effect is still heightened by the grandeur of several trees, majestically towering above, and overspreading the rest: among which are a Norway Spruce, at least 80 feet high; a Cypress, (*Cupressus disticha,*) 25 feet 6 inches in circumference, and 114 feet high; native Magnolias, Flowering Acacias, &c. And beneath this lofty display of variegated folinge, on proper fixtures, I noticed a magnificent Sago Palm, the circumference of its foliage 24 feet, and the stem 3½ feet. But it is vain to attempt enumeration, when the bare catalogue would four times exceed my limits.

Between this beautiful and magnificent grove and the Schuylkill, are several fishponds, with gold and silver fish and acquatic plants; and still farther on, towards the river, is an ancient cider-mill, cut, with great labor, out of the solid rock, near which was a small plot of Gama grass. From the numerous accounts of the productiveness of this grass at the south, particularly in North and South Carolina, it must be found a good substitute for clover, herds grass, &c. &c., and its introduction of great importance to that section of our republic. But from an examination with some of it, raised in my garden, and also the opinion of Mr. Carr, who has had it on his grounds a dozen years, I am led to con-

clude it will be of no great value to our northern farmers. The vines and fruit nurseries were extensive, and appeared in perfect keeping with the rest of this splendid establishment.

Nor was this display of nature more pleasing than the polite attention of its worthy proprietor, who not only answered, with apparent pleasure, all my questions, which, to say the least, extended to the utmost bounds of civility, but showed me many deeply interesting curiosities, and, among other things, his extensive and valuable library, principally on Agriculture, Horticulture, and Botany, which seemed to say,

"Come, let me make a sunny realm around thee,
Of thought and beauty! Here are books and flowers."

Leaving this place with reluctance, I steered my course to Lemon Hill, which is the name very appropriately given to the pleasure grounds of Mr. Henry Pratt. It is situated in the immediate vicinity of the grand Water-works, and is said to contain over twenty acres. Nature seems to have displayed her utmost power in modelling this charming situation, leaving but little for art to accomplish, to render it one of the most delightful spots on earth; and art, with such a bold and lovely model, appears to have availed herself of every advantage, to beautify and complete what Nature had so happily begun.

The mansion is placed on an eminence, commanding a delightful view of the Schuylkill, just at that point where every thing is in pleasant motion. The busy neighborhood of Fairmount, the interesting views of this fine landscape, are fully kept before the eye, by gently winding paths, through a rich and well kept grass plot; every turn producing some new and pleasing effect. The foot does not tread in the same path which the eye has gone over before. The groups of lofty trees, so advantageously placed on the hill, near the house, with their deep green foliage, form a beautiful contrast with those of more light and stinted growth, situated in front of the ground bordering on the water; thereby adding much to the effect, by seeming to remove the perspective to the farthest extremity of the picture. The numerous well stocked fish-ponds, with their islands and aquatic productions, summer-houses, gardens, porters' and laborers' lodges, all well placed for picturesque effect; and the beautiful little grotto, thrown so chastely over the mineral spring, all conspire to complete the beauty and variety, without, in the least, marring the productions of nature, so very interesting in the immediate vicinity. The spacious green hot houses, with their numerous and lovely tenants, spread far and wide in every direction, making the whole garden a repository of flowers and fragrance, certainly stand prominent in their kind; and as we migrate along the well kept gravel walks, so richly adorned by tree, shrub, and plant, of every shade and shape, and from every climate, intermixed with the inmates of the green house, the shaddock, orange, citron, lime, the fig tree, laden with inviting fruit; the sugar cane, pepper tree, banana, guava, and plantain; the cheremalia, mango, and splendid cactus; a reflecting mind must be lost in admiration, not knowing which most to admire, the amazing variety produced by nature, or the wealth, liberality, and taste, which have planted and sustain them there.

As I cast a valedictory glance at this enchanting scenery, the power of association brought forcibly to my mind the sligthed and neglected talents of my worthy friend Perrine, whose whole soul is compounded of botanical science and horticultural taste. Had the magnanimity of our wise National Legislature been sufficient to have granted his petition, for a few acres of wild, and, probably for a long time to come, worthless land, on the peninsula of Florida, and the little pecuniary aid, to which every sensible man in the nation would have been proud of contributing, to enable him to establish a national repository, for the introduction and acclimation of exotic plants, he would ere now have exhibited all the beauties and rich treasures of the vegetable world, flourishing in high exuberance, without the expensive aid of artificial heat. One half of the amount, which the patriotic and noble spirited proprietor of this establishment has expended, from his own purse, would have accomplished his object in a manner highly creditable to the nation, and profitable to the present and future generations. But public bodies, like corporate bodies, have no souls.

But I found the plan of my pleasing excursion, as I now find that of my letter, extended beyond the bounds to which circumstances limit its accomplishment; and I had then, as I have now, to quit the subject almost at the beginning. You know my attachment to the subject of horticulture, and you know there is nothing else so pleasing to me, except the cultivation of the human mind. But here I had both the subjects before me; one, in the situation I have so faintly described, and the other, in the more than pleasing urbanity and politeness of its proprietor, either of which, to say the least, I never saw excelled. I have ever been of the opinion, that a spirit to relish, and taste to direct horticultural improvements, is commensurately an evidence of an amiable and philanthropic disposition; and, if proof were wanting, I found it amply displayed, in the kind attention, which, as a stranger, I received, not only from Mr. Pratt, but from his principal gardener.

The day was now far spent, and I had only time to take a slight glance at the water-works. As I am not familiar with the subject of mechanics, and if I were, I had now no time for

"Examining with care each wondrous matter
That brought up water."

I can only say, of the whole, it is a stupendous establishment. But there was a peculiar charm to me in the reservoir on the hill, consisting of three beautiful sheets of water, and a fourth in operation.

The time I had allotted for my stay was nearly exhausted, and I had examined but two of the gardens, of which I had procured a long list. I had promised myself the pleasure of visiting Mr. Parker's Botanic Garden, Mr. McArran's Botanic Garden and Nursery, Mr. Hibbert's Nursery, Messrs. Landreths' Nursery, and others of equal celebrity; but the imperious call of business compelled me to forego the pleasure, and it being now Saturday night, I returned to my lodgings.

On Sunday morning I attended Church. But in the afternoon, as an exercise not altogether unapropriate for the day, I visited Rolinsan Rural Cemetery. This is a place which, though no person of common sense could leisurely enter with feelings of levity, yet no reflecting mind could spend a few moment's contemplation in it, without experiencing emotions of exquisitely pleasing satisfaction, though still partaking of a sober seriousness nearly bordering on melancholy.

This place contains 2½ acres. It was commenced in 1827, and now contains between 4 and 5000 interments, and about 100 vaults. When it was first commenced a lot about 10 by 8 feet sold for $40, but will now command from $90 to $100. An adult stranger can be buried for $8, and a child for $4, including opening and closing the grave.

The place is inclosed on three sides with a handsome stone wall, and the front side with an iron railing. On the right hand of the entrance is a dwelling for the attendants to the concern, where they are at all times to be found. On the left is a green house, with rooms over it for meetings of the lot-holders and managers.

The plants in the green house are for the purpose of ornamenting graves, at proper seasons; and hardy flowers in great variety are growing, tastefully and liberally scattered over the ground.

Among the various and numerous monuments, some were of peculiar elegance. I noticed one, on which the incription stated that it was executed in Italy. It was of exquisite material and workmanship, and I could not help admiring the skill in the fine arts peculiar to that country; but looking a little farther, I was most agreeably astonished to find one executed in Philadelphia, quite surpassing it; I could not but indulge some feelings of pride in reflecting on the amazing improvement since 30 years ago, when similar monuments were ornamented with an awful staring death's head and marrow bones.

Among the interments I noticed that of a Chinese, aged 37, buried in 1830. Part of

the inscription was in the Chinese character.

I could not view this interesting spot without painful reflections, on what appears to me the unpardonable want of similar institutions in the great and opulent State in which I live. Can it be from a want of social affection in the people in this state, or can it be from feelings of parsomony, that we grudge the expense, that we suffer our friends to be put under the turf to-day, and the place of their rest broken up and perhaps appropriated to some other use to-morrow? The Corporation of your city are selected for their supposed fitness, and are duly authorised and empowered to manage and direct all affairs of public interest; and is it not a duty they owe to protect the public feelings, from what must be daily suffered by persons who cherish with tender affection the memory of their deceased friend, when they see the place of their remains turned into a common highway, or perhaps dug up, and their bones scattered and trodden into dust?

This is naturally a public concern; but if it does not soon receive the attention the importance of the case demands, it will pass into the hands of private speculation, from which it would be difficult to return it to its proper channel, and which would place it in a state truly to be deplored by every person whose heart is warmed by a spark of philathropy or patriotism. But to return.

On Monday morning I left Philadelphia, and I can truly say, I never spent three days in more pleasing gratification. Getting on board the steamboat, I lost much of the beauty of the scenery on the way to Trenton, by accidentally taking up part of a number which I had not seen before, of a new and beautiful little periodical entitled the Zodiac: it so completely engrossed my attention, that I saw nothing else till I had finished perusing it, just as we arrived at Trenton.

As natural history is in some measure my hobby, of course my attention was particularly occupied by the *Naturalist's* book, in which I was confident I recognized the pen of my esteemed friend Doct. ——, and I determined to patronize the Zodiac at my return. A. W.

To our Agriculturalists. By W. P. [For the New-York Farmer, and American Gardener's Magazine.]

Foreigners, the least conversant with the grades of society in Europe, are much surprised at the low social estimation of the agriculturalists of this country. In every part of the civilized world, excepting this, they are ranked among the foremost in public opinion; here, every petty shopkeeper is considered their superior. There are many exceptions to this rule, but as a class it will be admitted to be correct.

There must be something radically wrong in the self-estimation of our farmers, or such an inverted state of their esteemed condition could not exist. To endeavor to induce them to make a fair estimate of themselves, is the object of this essay. I will attempt to show them why, as a class, they ought to rank at least as high as any other, and then point out to them why they now rank so much lower in public opinion than those of the same class in other countries. I have no wish to increase their pride, for man has nothing to be proud of; besides, pride, as the term is generally understood, is a mean, grovelling quality, exactly adverse to a fair appreciation of ourselves in our social capacity.

The fact, that the cultivators of the soil are the primary producers of the whole wealth of a country, is of itself sufficient proof of their superiority as a class. This fact will no doubt be denied by many of our dealers and shopmen, who are incapable of tracing effects to causes, and who, wrapt in self-conceit, have assumed a station that does not belong to them. The fact, however, can be easily demonstrated, which I shall endeavor to do in as succinct and plain a manner as possible.

We have about two millions of families, including farm laborers, employed in agricultural and horticultural pursuits. This estimate may be considered excessive, for there may be less than two thirds of our whole population engaged in cultivating the soil; but however much beyond the reality, it alters the conclusion to be drawn from the premises only in diminishing the amount put in circulation annually, not in its inductive facts. We will suppose that the land under cultivation affords no surplus beyond the support, in the first necessaries of life, to those employed in cultivating it. It is evident, in this case, that the farmers having nothing to sell, would be unable to purchase any thing; that every individual of our population would be compelled to cultivate the soil to obtain an existence, for there would be neither sellers nor purchasers. We will further suppose that the average surplus of each family, beyond their own existence, to be fifty dollars per annum, and that the whole of this were wanting to supply agricultural instruments. The amount to be expended would now be one hundred millions of dollars per annum, which would put into operation a given number of workmen in wood and iron, as well as a small number of dealers to facilitate the receiving and executing of orders. Trade has now commenced, but never could have started but for the farmers' surplus. If the average surplus of each agricultural family should be one thousand dollars, an estimate probably very near the truth, and the greater portion of this surplus be expended in the usual variety of objects which go to promote the comfort and luxury of families, it is evident, that in addition to the workers in wood and iron, there would be put in operation builders, cabinet makers, clothiers, and a thousand other sources of industry.

If, when these agents have accumulated capital, and by this means extended their operations so as to meet the increasing demand of the agriculturalists, shall pride themselves on a factitious superiority, forgetting in toto the source of their wealth, ought they not to be pitied rather than admired by the intelligent part of community?

The amount put in circulation by our farmers, on the last estimate, would be two thousand millions of dollars per annum, and the number of workmen and agents employed to execute orders would be vastly increased. The whole capital accumulated by the country is exactly the amount saved out of this surplus, by the farmers, and the agents and workmen employed by them.

That our farmers should have a surplus of two thousand millions of dollars per annum, over and above feeding their families, would appear, at first sight, to be much overrated; but after deducting four hundred millions for the wages of workmen, and three hundred for buying and planting new farms, building houses and barns, buying new instruments of agriculture and repairing old ones, we shall find that it leaves but about eighty-five dollars per head for our whole population for clothing, furnishing, and other necessaries and comforts sought by those who can afford to purchase them. It should also be recollected that five millions of our population derive all their necessaries, comforts, and luxuries, from this surplus, and that the annual accumulation of capital is a product of that excess.

So long as there is land in a country of first and second rate qualities, for the creation of new farms, so long can this primary source of wealth be extended. There is also ample room in this country for a great extension from the land now under cultivation, as at least one third more product could be raised from it than is now produced; but as this consummation cannot possibly take place until interest of money and wages are lower, or new labor saving machines shall be invented, we must hope rather than expect to see it realized in our day.

Manufacturers, dealers, and shopmen, and, in fact, all who are not laboring on farms, derive their whole support from this agricultural surplus. The capital, accumulated by those agents who buy and sell, whether merchants, shopkeepers, or dealers in any commodity, being savings from the varied circulation of said product, the farmers ought surely to be entitled to their highest consideration.

This surplus is by no means stationary, and the prosperity of some years, as well as the depression of others, are the results, in the greater number of instances, of the greater or smaller surpluses. If the surplus one year should be twelve hundred millions of dollars, another seventeen hundred millions, and another twenty-two hundred, it would be easy to account for the elevations and depressions in the business community of the country. In fact, the variations which annually take place in these surpluses is the only true barometer of a country's prosperity.

When merchants, manufaturers, and dealers in a country are operating with large masses of capital, the accumulation of many years, concentrated in cities and towns, they lose sight altogether of the original source of wealth. And where the right of primogeniture does not exist, as in this country, to enable agriculturalists to

concentrate their property in the heads of families, the other classes will, apparently, be much richer, and claim a superiority. Their riches, however, is only *apparent*; for the far greater portion of wealth in every country must ever remain with the owners of the soil. Much of the capital wielded by dealers is altogether fictitious, being predicated on credit, and a considerable share of their more solid capital is borrowed from the savings of property owners.

Let me ask our farmers why it is, with so many solid claims to superiority, that as a class they tacitly acknowledge themselves inferior to those who are their dependents? I need bring forward but one circumstance to prove the fact. When our farmers have a son they consider more than usually talented, do they not bestow a better education on him, with a view to settle him with some merchant or dealer in our cities or towns, and this with the fearful odds against them of his being ruined in pocket, mind, and body, as is the fatal issue with three fourths of the whole number? This is plainly acknowledging that it requires more talent and a better education to make a dealer and shopman than it does to make a farmer, and this depreciated view of their own condition is the main cause of their being undervalued by the community in general.

There is no business or profession, in the whole circle of human pursuits, that requires more solid talent to execute well than that of cultivating the soil, and there is no class of our citizens whose education is so generally neglected. It is too generally considered that to learn to plough, harrow, sow, drill, and plant; to harvest well when crops are ripe, and sell when ready for market, are all the qualities necessary for a farmer, with the addition of a little cyphering and writing. These, it is true, are necessary qualifications for every man who has the management of a farm; but they are by no means all that are requisite to make the pursuit yield its greatest degree of profit, and sufficiently interesting to attach the most enterprising and talented of its sons to the calling. If the owners of the soil are desirous of acquiring wealth, and at the same time that degree of respectability which will make them respect themselves as a class, they must acquire far more knowledge than the mere drudgery of a farm. They should know practically how to perform every branch of labor, in order to understand when their workmen do them justice; but the pursuit must indeed be miserably unproductive and uninviting if the owner of the estate cannot make more by systematizing his business, and superintending the carrying out of the system, than by personal labor. They should understand mensuration sufficiently to be able to calculate the quantity of land after the chain has been run; the advantages of draining, with the most effective and most economical way of operating; the properties of different soils, including a knowledge of what seeds and plants are most productive in each, with a critical judgment of the manures or composts best adapted to different qualities of soil; sufficient of botany to enable them to judge of seeds, plants, and fruit trees, with the best mode of producing them in the greatest abundance and in the highest degree of perfection.

It will not be denied that to acquire such knowledge would be highly advantageous to our agriculturalists, and not only to them as a class, but to the general community, for the average of the farming surplus would become so much larger as to materially benefit the whole mass. But, say they, how is this knowledge to be acquired? neither our common schools, academies, nor colleges, give any such instruction, therefore we have not the means of acquiring it. This objection is too true, and is a truth highly disgraceful to the enlightened age in which we live. The means of acquiring an agricultural education ought immediately to be put within the reach of this our most valuable class of citizens. In every college there are professorships for physic, law, and divinity, but none for that class on which our prosperity and very existence depends. Agricultural schools, academies, and colleges, with experimental farms attached to each, and with such professors as are requisite for the scientific departments, cannot be too soon established. The expense of such establishments would be repaid a hundred fold during the existence of the rising generation. A farmer should learn arithmetic, mensuration, agricultural chemistry, mineralogy, geology, and the physiology of seeds, plants, trees, and animals. A certain portion of his time should be appropriated to acquiring scientific knowledge, the remainder to practical operations of scientific principles. The expense of such an education should be as moderate as possible, particularly in the commencement so low, as to induce those who have but little to spare for education, to send their sons to such establishments, in preference to any others, on the score of expense alone.

With such an education, our farmers, instead of looking to other pursuits for their most talented sons, would feel it a degradation to place them any where but on the soil. Their sons, too, finding agriculture the most exalted of human employments, would be proud of their calling. That time of the year in which they are most unemployed, in place of hanging heavy on their hands, would be appropriated to improving their minds. They would as a class stand boldly prominent in the front ranks of society, and instead of any feeling of inferiority, as is now too much the case, would be able justly to consider themselves on a perfect equality with the best of any class; and that ignorant flippancy they now so much admire in others, would be found hollow and disgustingly nauseous. Politically they would become truly independent, and in place of being the tools of designing political knaves, they would have intelligence to enable them to think justly on every political subject, and manhood to back their opinion. But the most exalted of all considerations would be the effect on their moral condition individually. They would not only be able to appreciate themselves and their pursuit fairly, as a class of the human family, but in the investigation of the wonderful arrangement in the order of nature, they would feel that man was a being of exceedingly limited powers, that his utmost scope was as nothing in the presence of Him whose infinite mind had arranged, and whose infinite power had executed the wonderful works of creation. In possession of a physiological knowledge of the construction of seeds, plants, and trees, with the adaptation of soils to their growth and maturity, their contemplations would open to them a nearer approximation to the Divine Mind, and whether in the field or their chambers, they would enjoy this greatest and most durable of all sources of human happiness, that they were never "less alone than when alone." W. P.

W. P. will not leave the subject, we trust, which he seems so well to understand, with a single communication. Our columns will always be open to such communications.—[Prof. N. Y. F.]

To the Honorable Louis McLane, Secretary of State of the U. S. A., Washington City.

Consulate U. S. A., Campeche, February 1st, 1834.

Sir,—The subscriber now presents a brief recapitulation of some facts and arguments, in favor of the *immediate* domestication of Tropical Plants, in the United States. He wishes thus to show, not merely that the cultivation of tropical staples is *practicable* in our Territory,—but also, that it is absolutely *necessary* for home consumption,—is positively *profitable* for the foreign market, and is highly *desirable*, in other respects, to promote the peace and prosperity of the Union.

The *practicability* of cultivating tropical productions in general, he has manifested with the facts, that the peculiar climate of the tropics extends beyond the astronomical boundary, several degrees north, into our peninsular territory; and that the best plants of the tropics are actually flourishing in the southern portion of that Peninsula, at Cape Florida. He has not only shown that, below 28°, Southern Florida enjoys the dry warm winter—the wet refreshing summer—the breeze by day from the sea, and by night from the land,—and the trade winds from the east, which are *common* to tropical countries in general; but he has also proved, by its narrow level surface stretching southwardly,—by he hot ocean river running northwardly, along its eastern shores,—and by the greater steadiness of the westwardly wind in those latitudes, that Tropical Florida is even *superior* to the elevated Islands of the West Indies, and to the broad Peninsula of Yucatan, in that *uniformity of temperature*, which is most favorable for vegetable growths, animal health, and physical enjoyment. He has moreover not merely shown that in this superior climate of the tropics, are already growing various common vegetables of the tropics, but he has further announced the flourishing condition of the tenderest, and yet most productive plants of the torrid zone,—the Banana plant, and the Cocoa palm, which are universally pronounced to be the greatest blessings of Providence to man; and

it may, hence, be considered experimentally demonstrated, that it is practicable to cultivate all tropical productions in the soil of the southern portion of the Peninsula of East Florida.

The *necessity* of cultivating tropical prot ductions for home consumption, is shown by the facts, that the *voluntary labor* of the many millions of the *colored races*, spread over the extremely great surface of the whole torrid zone, does *not* create scarcely any *cultivated* tropical productions for extra tropical consumption; that the *forced labor* of the few millions of the *black race*, on an extremely small surface of the West India Islands, *does* create nearly all the cultivated staples for exportation; and, that the forced labor of this black race, with its essential auxiliaries, the skill and capital of the white race, is becoming greatly reduced by the recent emancipating act of the British Parliament.

According to Crawford, the friend and author of "Sugar without Slavery," the free labor of all the natives in the immense belt of the world, between 30 N. and 20 S. latitude, supplies an annual exportation of about 61,500 tons of sugar,—a quantity which is not equal to the biennial crop of the slave labor of the few negroes in a little district of Louisiana!! Indeed, the greatly superior productiveness of the forced labor of the *colored* natives in *hot* climates, over the voluntary labor of those races in those climates, is doubted only by distant theorists on the false data obtained from the voluntary labor of the *white* natives of *cold* climates; and from the unphilosophical supposition of the equality or sameness of the different species of mankind. Yet, while this undeniable fact unequivocally shows the relative advantage of employing our existing slaves in the cultivation of tropical staples, it is not cited to prove either the positive propriety or the political expediency of the perpetual continuance of our negro slavery. On the contrary, it is expressly admitted that the *free labor of the white race* is so *much more productive* than either the *forced or free labor of the black race*, that on this account alone it will in time become desirable to transfer all the colored species to their original Africa, and to avail ourselves, even in tropical agriculture, of the voluntary labor of our white citizens alone.

As, then, the withdrawal of European skill, capital and force, from the negro labor of the neighboring portions of the torrid zone will diminish so greatly the agricultural production of tropical staples for exportation, it has become absolutely *necessary* to employ American skill, capital and force, on the negro labor of certain portions of our own territory, to create an equivalent supply of cultivated tropical products for the home consumption of the United States.

The *profitableness* of cultivating tropical staples for the foreign market, may be shown with the facts, of the immense superiority of our people and of our institutions over those of the torrid zone. Our population is composed of the best varieties of the human genus—combining all the moral and intellectual improvement of the most civilized nations of Europe. Our government is the best in the world, because it is the government of a most moral, industrious, enlightened and enterprising people. On the contrary, the best colored species of the torrid zone are inferior to the worst varieties of the white species of the temperate zone, in the capacities, as well as in the desires, of improving their individual and social condition. Their varied *mis*governments are the natural results of an indolent, ignorant, immoral, imbecile, and, consequently, poor population. Possessing very few personal desires, and very little political protection, scarcely any skill, and rarely any capital; however abundant may be the free laborers, and however cheap the free labor, their agricultural products must continue to be scanty and dear. Even in the nominal republics of tropical America, the agriculture of their Indian citizens very rarely affords an adequate supply for their limited domestic market, or even for their scanty personal consumption alone; and the future unproductiveness of the free negro subjects, of the British Islands, may be inferred from the actual desolation of St. Domingo. Our only rivals, then, in the cultivation of tropical productions for the foreign market, will be the colonies in which slave labor may remain combined with European skill and capital. Of these, the most formidable is the Island of Cuba, and yet her population and government are greatly inferior to those of the United States, for prosperous agriculture. The Spanish varieties of the white species of mankind, is notorious for the numerous defects of the national character, institutions, and even religion of the individuals who compose it on both sides of the Atlantic Ocean. The disadvantages for profitable production common to all colonial establishments, hence increase, both in number and weight, in a Spanish colony. The innumerable taxations of most Catholic despotism, on the time and money of its subjects, rival, in abusive oppression, the numerous exactions of most Catholic superstition, on the purse and pursuits of its professors. But independently of every other consideration, the exemption of the American planter from the heavy duties paid by Colonial planters, on the extra-tropical productions of the United States, consumed by their laborers, will enable the former to furnish tropical productions much cheaper for the European market. Even under the disadvantages of soil and climate, in our Atlantic Southern States, their actual cultivated productions of the tropics—their rice, tobacco and cotton, are profitably exported to every portion of the torrid zone itself, in spite of heavy duties and prohibitory laws; and it may be confidently predicted, that within five years, even the sugar of Louisiana will be smuggled into every port of Spanish America.

The *desirableness* in other respects, of cultivating tropical productions to promote the peace and prosperity of the Union, may be shown by a reference to the hostile policy of the governments of the torrid zone, to the present agricultural distress of the southern portion of our old Atlantic States; to the future probability of employing the free labor of our white citizens, in the agriculture of the warmest sections of the confederation; to additional considerations derived from the climate and position of South Florida; and to our moral obligations to improve the condition of our country.

The actual condition of the West India trade illustrates, not merely the disadvantages of foreign legislation to our merchants and mariners, but also its still greater injury to our farmers and other creators of domestic products for the tropical markets; as any diminution of consumption in foriegn ports not only diminishes the price of the small excess created for exportation, but also of the immense amount produced for home consumption. The fact that the fluctuations in foreign demand cause the ruinous fluctuations in domestic value, is alone an argument for substituting a domestic market; and this substitution has, moreover, become an absolutely necessary measure of self defence, against the hostile laws of the governments of the torrid zone. Nearly all our most important products, both of Agriculture and the Arts, are either loaded with excessive duties, or entirely prohibited in tropical ports. Even our neighboring Republics of Spanish America will not admit our northern wheat or southern rice, unless when compelled by famine; nor our greatest staples of tobacco and cotton, under any circumstances whatever. As tropical Mexico refuses to take in exchange our corn and our rice, our tobacco and our cotton, we are therefore virtually compelled to cultivate her vanilla and her jalap, and her cochineal cactus, and above all the *foliaceous fibres* of her Henequen Agaves. As tropical Cuba refuses reciprocity to our vessels, engaged in transporting her sugar and coffee to our own ports, we must cultivate enough of both staples, to freight them more profitably in the coasting trade. But even under the most favorable legislation of tropical countries—a perfect and perpetual free trade—our landed and shipping interests may be both more profitably employed in domestic commerce, with the producers of tropical staples in our own territory. It has already been proved that even our slaves can create cultivated products more abundantly, and much cheaper than either the freemen or slaves of the torrid zone. It is also equally certain, the standard of comfortable subsistence being so much higher in the United States, that even our slaves consume a much greater quantity of extra-tropical products. Hence, a reciprocal augmentation of supply and demand will form a mutually more profitable trade between the colder and warmer divisions of the Union.

The *agricultural distress* of the *sterile* districts of the *old* States, (or northern and southern Atlantic States,) is principally caused by the cultivation of their common staples in the *fertile* districts of the *new* States, (or western and southwestern States;) and the only agricultural remedy for this distress, will be found in the cultivation of such new staples *as are equivalents to adding fertility to barren soils.*

It is true that the farmers of the cold

northern Atlantic States cannot well compensate themselves, for the superior productiveness of the western States in corn and wheat, by cultivating the vine and the mulberry; and that hence many are forced to become manufacturers and mariners; but it is very certain that the planters of the warm southern Atlantic States can more than compensate themselves, for the superior productiveness of the southwestern States in rice, tobacco and cotton, by cultivating the cassave jatropha, the cochineal cactus, and the henequen agave; and that the sugar palm on the poorest soils of Georgia, will be more profitable than the sugar cane on the richest loams of Louisiana. As we possess all the soils and climate, with the best people and institutions of the world, we have neither the necessity, nor the desire, nor the power of European agriculturalists to force the production of similar plants, in inferior climates and on inferior soils. On the contrary, an American cultivator must select the naturally most productive soil and climate for a given plant, or the naturally most productive plant for a given climate and soil. Hitherto our agriculturalists have preferred changing the place of location to varying the object of cultivation; and hence the fertile valley of the Ohio and Mississippi furnishes the cheapest and most abundant supply of our present staples, both for the domestic and foreign market. Although the only formidable rivals of our western and southwestern cultivators, *are themselves*, they have already reached the extreme of over production for foreign consumption. Our southern planters, on their inferior soils, cannot hence any longer continue the profitable production of similar staples: and by augmenting the number and capital of southwestern planters, they only injure the latter without benefiting themselves. They must, therefore, seek *new staples* of cultivation in the *naturally most productive plants for their reputed barren soils*. Rich and poor, fertile and sterile, are only *relative epithets* in their application to agriculture; and hence the poorest soils for rice and cotton, may be the richest soils for cassave and henequen, and the most sterile soils for the tobacco plant and the sugar cane, may be the most fertile soils for the cochineal cactus and the sugar palm. "Palm sugar, not cane sugar, supplies the great consumption of the people of the East Indies, in the poorer and more mountainous countries." "As the palms are the produce of poor soils, and the labor is so small and the quantity of saccharine matter from them so great, that palm sugar is produced at about *half the cost* of cane sugar, of the same degree of purity,—that is, for something less than one penny per pound."

Our present tropical staples require a costly, troublesome cultivation; demand a thick vegetable mould; and impoverish the richest soils in which they are planted.

But the future tropical staples of the south will need only a cheap, simple cultivation; will content themselves with bare sandy earth; and will actually enrich the poorest surfaces on which they spontaneously grow. And as our tropical rice, tobacco, and cotton, on equal soils, are absolutely more productive than in their native climates, we may confidently anticipate that our southern States will enjoy an equal superiority in the culture of tropical cassave, cochineal, and henequen.

Reciprocal prosperity being thus restored, our southern brethren will cease to calculate the value of the Union.

The possibility of employing the voluntary labor of our white citizens in tropical agriculture, becomes especially important, from the consideration, that the United States embrace the only portion of the world in which the best laborers and the best institutions can be combined, in the cultivation of tropical productions.

The neighboring miscalled Republics contain four times as many Indian as white citizens; the latter are the least productive variety of the white race, and their governments are mere military anarchies. The neighboring distracted Colonies contain a majority of negroes, who, when freed, will expel the whites; and thenceforward, like their Haytian predecessors, they will be productive alone in the propagation of their species. Tropical Asia and Africa cannot endure white laborers, nor free institutions; and Europe has not any tropical climate into which her white laborers can extend.—But our Southern States contain already a respectable number of white laborers; and in Florida they will probably outnumber the negro laborers. The slave States, in their own time and manner, will eventually emancipate and transport all their colored laborers; and we shall then present to the world, the only possible example of tropical staples created by the most productive species of mankind, under the most favorable form of government on earth.

The additional considerations derived from the climate and position of South Florida, embrace the retention within our borders of those fellow citizens who annually leave it to locate themselves or to perish in foreign countries. Texas and Cuba are constantly attracting our agriculturalists, who soon sorrow for the happy institutions of their Fatherland, and who will return when the existence of a superior tropical climate in Southern Florida shall become generally known.

The south of France and of Italy have hitherto invited our invalids to perish in the great vicissitudes of their changeable climates, but hereafter they will seek for health in the unrivaled uniformity of temperature, and advantages of position, presented by the tropical extremity of our Peninsula.

Our moral obligations to improve the condition of our country are based on the unparallelled combination of advantages with which it has been favored by Providence. With the most favorable form of government, and the most productive varieties of the best species of the human race, we have all the soils and climates of the earth; and the consequent ability to cultivate most profitably all the most valuable varieties of the best species of the vegetable race. It hence becomes our duty to combine within our territory the creation of the greatest possible amount and variety of cultivated vegetable products for the physical enjoyment, not merely of our own citizens, but also of the inhabitants of all extra-tropical countries, and probably even of the natives of the torrid zone itself. It has been demonstrated, that with a natural equality of soil in even our extra-tropical climates, our slave labor can create cultivated tropical products much more abundantly and cheaply than either the free or slave labor of the colored natives of inter-tropical countries; that many articles of tropical, culture instead of deteriorating, become more productive beyond their native zone; that we may ultimately apply the still more productive free labor of our white citizens to the cultivation of tropical staples; and that such laborers, under such institutions, cannot be devoted to tropical agriculture in any other part of the world. The great equatorial current of the ocean, after cutting off New-Holland from Asia, wearing its way round southern Africa, and being reflected by tropical America, brings to our shores, under the name of the Gulf Stream, the accumulated heat of the torrid zone to encourage our cultivation of the valuable vegetables of that unproducing belt of the globe. The white population on its borders will soon be forced to embark on its bosom for the United States. Once entirely abandoned by the skill and capital of the white species, the colored species will not furnish an adequate quantity of even *uncultivated* products for extra-tropical consumption. Even logwood, mahogany, and other wild materials for the arts, are dimishing every day. The Peruvian bark, sarsaparilla, and other spontaneous medicines, are also vanishing, and noxious substitutes are exported to kill, instead of cure, our fellow citizens. If, therefore, we do not *speedily* naturalize *all* useful tropical plants in tropical Florida, they will soon disappear from the surface of the world.

I have the honor to be, Sir,
Your obedient servant,
HENRY PERRINE.

To the Honorable Louis McLane, Secretary of State of the U. S. A., Washington City.

CONSULATE U. S. A., CAMPECHE, February 20th, 1835.

Sir,—As an appendix to his communication of the 1st inst., the subscriber avails himself of the only statistical data in his power to *demonstrate* the greatly superior productiveness of slave labor in the United States over slave labor in the West Indies.

British West India Colonies, 692,700 slaves, 427,392,000 sugar, and 19,769,500 coffee exported.

Spanish Island of Cuba, 286,942 slaves, 162,703,425 sugar, and 42,971,625 coffee exported.

Louisiana, 109,631 slaves, 70,000,000 sugar, and 72,000,000 cotton exported.

Now, admitting for a moment that the culture of cotton is merely equal to the culture of sugar and coffee, as 109,631 slaves produce 142 millions of sugar and cotton in Louisiana, in the same proportion, 692,700 should pro[illegible] millions

of sugar and coffee in the British West India Islands: and in the same manner, 286,942 slaves should produce 371 millions of sugar and coffee in Cuba.

But the former do produce only 447 millions, and the latter only 205 millions, together 692 millions, instead of the 1268 millions which they should produce in proportion to Louisiana. But the truth is, that the relative value of labor of the production of cotton is at least fifty per cent. more than the value or labor of the production either of sugar or coffee; and hence the combined 979,642 slaves of British W. I. Islands and of Cuba, should yield 1590 millions! instead of 672 millions of sugar and coffee, every year, for exportation; or in other words, with an equal number of slaves, Louisiana would supply the consumption of the world!!

To obtain the details of the relative productiveness of a single negro, the following estimates are presented of a sugar plantation in Louisiana, and of a sugar plantation in Cuba, each assumed to yield annually 400,000 pounds of sugar.

The first are contained in the report of the Agricultural Committee of Baton Rouge to the Secretary of the Treasury, against the reduction of duties on imported sugar, and must hence be presumed to present the most unfavorable aspect of the cultivation of sugar in Louisiana. The second is taken from pages 108-9 of the Statistical History of Cuba, by Dr. Ramon de la Sagra, who presents the most favorable aspect of the cultivation in genera of the staples of that Island. The first diminishes the average product of an acre in Louisiana, to 1000 pounds of sugar. The second exaggerates the average product of an acre in Cuba, to 2038 pounds of sugar,—although he had previously admitted that Humboldt was correct in limiting it to 1116 pounds the acre, or 1500 arrobas the caballeria.

The Louisiana plantation is stated 1200 acres=$50,000; improvements=$50,000; negroes 80, at $600 each,=$48,000; total 148,000 dollars.

The Cuba plantation is allowed only 30 caballerias, or 981 acres,=$54,000; improvements=$65,490; negroes, 90, at $400 each,=36,000; total 155,490 dollars.

Of the Louisiana plantation, *one third*, or 400 acres, is cultivated—giving to each negro 5 acres, and 5000 pounds product in sugar.

Of the Cuba plantation, *one sixth*, or $196\frac{2}{10}$ acres, is cultivated, giving to each negro $2\frac{1}{10}$ acres, and $4444\frac{4}{9}$ pounds product in sugar, i. e. $555\frac{5}{9}$ pounds *less*.

The proportion of the annual expenses of the whole plantation is, for the negro in Louisiana, only 105 dollars,—while for the negro in Cuba, it ascends to $151\frac{48}{100}$ dollars; i. e. $46\frac{48}{100}$ dollars *more*.

Hence, although the slave in Cuba may cost 50 per cent. *less*, and the ground he works may produce upwards of 100 per cent. *more*, the slave in Louisiana, both positively in sugar and negatively in money, may gain for his master upwards of 100 per cent. more!!

Without reference to the *price* of the [illegible] of the coffee, or of the cotton, it may, in the same way, be shown, that on *inferior soils* even our slave labor will create much greater quantities at much less expense!! But when we admit the soil and climate to be *equally* productive, how infinitely superior are the products of American *skill*, capital and *economy*, combined; and when we still further contemplate the *greater* productiveness of most articles of tropical culture, acclimated within our territory, we may safely anticipate that within twenty years, the southernmost sections of our Union will yield every tropical staple for the consumption of even the torrid zone itself.

I have the honor to be, very respectfully, sir, your humble and ob't serv't,

HENRY PERRINE.